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A study of the stock market seasonality : what causes the abnormal January return?

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A STUDY OF THE STOCK MARKET SEASONALITY: WHAT CAUSES THE ABNORMAL JANUARY RETURN?

A Dissertation Presented

By

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ABSTRACT

A STUDY OF THE STOCK MARKET SEASONALITY:
WHAT CAUSES THE ABNORMAL JANUARY RETURN?

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by Kyungchun Chang

Directed by: Professor Ben S. Branch

This study analyzed possible causes of the stock market seasonality. Ten portfolios were constructed according to the magnitude of the stock returns at one month and their reurns were examined for the following month. The losers (lowest return decile) of one month were found to perform better on the average than the market in the following month both before and after risk-adjustment. The January market differential returns (or the abnormal returns) to the losers in December has been especially remarkable.

The composition of the stocks in Portfolio HDl (the losers) was analyzed. Small firm stocks and low-priced stocks were found to perform better than the large firm stocks and high-priced stocks. The composition of the portfolio did not differ significantly from month to month. Thus, the strong performances of small firm stocks and low-priced stocks do not appear to be restricted to January. Either these stocks have strong confounding effect with the December losers or the abnormal January return is due to some other factor(s).

While the losers of one month were found to tend to rebound in the following month, especially in January, the return movements of the winners were virtually random. The stocks traded in the AMEX and NASDAQ-OTC seemed to experience a stronger market effect than those traded in the NYSE.

When the returns were computed assuming that market orders were used (buying at the ask, selling at the bid), the pattern of the return movements of each portfolio became obscure and the strong negative association of the losers diminished. These results are, however, only based on a single year's data of the NYSE stocks.

The high overall January return seems to come largely from the losers of December, thus supporting the tax-loss selling hypothesis. The tax-loss selling candidates which rebound in January tend to be disproportionately small firm stocks and low-priced stocks. While the gross rates of return to these stocks are rather high, the net rates of return after risk-adjustment do not seem to be large enough to cover the transaction costs. Besides, when a return was computed on a market order basis (using bid and ask prices), only the market seems to exert any influence.

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C H A P T E R I

INTRODUCTION

Although the academic theory of stock price movements goes back to the turn of the century, empirical studies were at best fragmentary until about the early 1960s. Since that time technical analysis has been thoroughly studied. The main item at issue is couched in terms of the efficient market hypothesis. (D'Ambrosio (1976))

> In an efficient market no one can consistently earn rates of return in excess of those warranted by the level of risks assumed.

Two assumptions underlie this hypothesis. First, the market mechanism for trading in stocks is assumed to be highly efficient. That is, no artificial barriers restrict trading of stocks, no matter who the participants may be. Second, all relevant information is assumed to be impounded quickly into the market prices of stocks, so that to garner abnormal returns consistently is virtually impossible. Most empirical evidence suggests that capital markets are efficient in their weak forms, that security prices conform to a fair-game model but not precisely to a random walk because of small first-order dependencies in prices and

nonstationarities in the underlying price distribution over time, and that semi-strong and strong form hypothesis do not always hold. (Alexander (1961), Fama (1965, 1970), Fama, Fisher, Jensen and Roll (1969), Jensen (1972), Jaffe (1974), Branch (1977), Reinganum (1982, 1984) and Roll (1984); a complete literature review is provided in Chapter II.)

Any predictable pattern in asset returns may be exploitable and, therefore, judged as evidence against semi-strong market efficiency. Even patterns that are too small or undependable to be employed directly in a trading rule because of frictions introduced by positive transaction costs may enable people who were going to trade anyway to increase their portfolio returns. One of the statistically significant patterns in stock market returns that received much attention in recent years is the "January effect".

The January effect has been documented by Officer (1975), Rozeff and Kinney (1976), McEnally (1976), Dyl (1975), Branch (1977), Keim (1982), Reinganum (1983), Roll (1983) and several others. Some stock prices decline in December, especially those of small firms and firms whose prices had already declined during the year. Then the prices increase during the following January relative to the market. The most likely cause of the year-end effect appeared to be tax-loss selling. At least the realized

rates of returns during the year and the size of the turn-of-the-year price recovery were significantly correlated. However, Reinganum (1983) first noted that the tax-loss selling hypothesis could not fully explain the abnormal January returns. He showed that small firm stocks could make higher returns regardless of their tax-loss selling candidacy. Roll (1983) also reported that for 18 consecutive years from 1963 to 1980, average returns of small firms have been larger than average returns of large firms on the first trading day of the calendar year. That day's difference in returns between equally-weighted indices of AMEX and NYSE-listed stocks averaged 1.16 percent over the 18 years. The t-statistic of the difference was 8.18.

Several researchers tried to explain the abnormal January returns by studying the tax-loss selling and size effect hypotheses. Their results, however, were not conclusive. Some found abnormal January returns for the large firms and some found abnormal January returns even from a country of different tax regimes. (See Gultekin and Gultekin (1983), Reinganum and Shapiro (1983), Berges, Mcconnell and Schlarbaum (1984), Keim (1983), Brown, Kleidon and Marsh (1983) and Brown, Keim, Kleidon and Marsh (1983)) This study explores other explanations for the abnormal returns.

Structure of the Thesis

This study seeks to explain the abnormal January returns. To this end, Chapter II will review the literature related to stock market seasonality and abnormal January returns. Preliminary results will be reported in Chapter III and several questions will be raised. Chapter IV analyzes the small firm effect, low-priced stock effect, the listing effect and the risk-adjusted results will also be reported. Chapter V further extends the study by analyzing the bid-ask spread of the stocks. The conclusions and implications stemming from the results will be discussed in Chapter VI.

C H A P T E R II

REVIEW OF RELATED STUDIES

Stock Market Seasonality

The existence of seasonality in stock returns has important implications for capital market theory, capital market efficiency and the nature of the distribution of stock returns. Following Fama (1965, 1970), most of the previous researchers argued that common stock prices follow a multiplicative random walk and investigated the existence of seasonality as an indirect test of this hypothesis. Most of these researchers examined the autocorrelation structure of stock returns.

Applying spectral analysis to aggregate monthly price data from 1875-1956, Granger and Morgenstern (1970) found no evidence of a seasonal (12-month) peak in the spectra although small peaks corresponding to seasonal harmonics (4, 3, 2.4 months) were quite frequently observed. Bonin and Moses (1974) looked for seasonality in the 30 individual Dow-Jones Industrial stocks using monthly price data adjusted for capital change over the 1962-1971 period. Using the Census X-11 program, they removed price trends via moving average procedures and adjustment of extreme

values. They applied several other criteria - comparision with other time series and tests on a holdout period - before accepting seasonality. They concluded that seven of the stocks displayed significant and persistent seasonal patterns.

Officer (1975) examined the price of 651 companys' shares of the Melbourne Stock Exchange over the 1958-1970 period and developed a mixed autoregressive and moving average linear stochastic model which included seasonal elements. He then showed that forecast errors using the seasonal model were lower in a holdout period than forecast errors using a simple random walk model. In contrast with Granger and Morgenstern (1970), he found a 9-month, 6-month and lesser 12-month seasonal in the autocorrelation function. He did not, however, reject the efficient market hypothesis and suggested that a more likely explanation is related to the structure of the economy, e.g., changing opportunity cost of money through the year.

Rozeff and Kinney (1976) illustrated the evidence on the existence of seasonality in monthly rates of return on the New York Stock Exchange from 1904 to 1974. With the exception of the 1929-1940, they found statistically significant differences in mean returns among months. The most outstanding feature of this seasonality was the higher mean of the January return distribution compared with most other months. They did not, however, find consistent

seasonal patterns in the dispersion measure and the characteristic exponent seemed invariant among months.

In their study of stock market seasonality, Gultekin and Gultekin (1983) found strong seasonalities in the stock market return distributions in most of the major capital markets around the world. They studied 17 major industry countries for the period of 1959 to 1979. Using parametric and non-parametric tests and a 10 % confidence level, they rejected the null hypothesis that stock returns are time invariant for 12 countries from a total of 17. And they reported that the seasonality, when it existed, appeared to be caused by the disproportionately large January returns in most countries and April returns in U.K. Berges, McConnell and Schlarbaum (1984) also found a similar result for Canadian stocks over the period of 1951 to 1980.

Givoly and Ovadia (1983) mentioned that the seasonality found in the market index could stem from several different sources; common seasonal factors affecting all securities(e.g., change in the money supply, interest rates, etc.); a seasonal pattern in the return of firms in certain industries, which does not wash out when returns across securities are aggregated to compute the market average; and the seasonality in the market index could be due to seasonal factors which affect each year a different group of security (e.g., tax induced sales or the release of favorable annual reports). Rozeff and Kinney

(1976) mentioned that the possible explanation for the stock market seasonality, abnormal January returns, could be 1) tax-loss selling pressure hypothesis, 2) accounting information hypothesis, 3) stochastic cash demand hypothesis and 4) small firm effect hypothesis.

Summary of the Seasonality Studies

Several studies using different methodologies and data reported different results on the seasonality of stock returns. In recent studies, however, most researchers found strong January seasonality. Although the explanation of the January seasonality is quite complex, the tax-loss selling hypothesis and the size effect hypothesis seem to be the major explanations.

Tax-Loss Selling Studies

McEnally (1976) theorized that stocks which have declined most severely during the year are most likely to be subjected to tax-loss selling near the end of that year. He found that severely depressed stocks did tend to display persistent price weakness in the last months of the year, followed by strong recovery after the year ended.

Examining 588 common stocks listed on the New York Stock Exchange from 1946 through 1965, he found an anticipated price effect of tax-loss selling in January.

Identifying tax-loss candidates as NYSE stocks reaching year-end lows during the week ending with the last Friday of the year, Branch (1977) found a tendency for them to rise relative to the market during the first four weeks of the following year. Although the tax-loss selling had little or no impact on the general level of stock prices in an average year, he concluded, the recovery of the depressed stocks in January did seem to conflict with what the weak-form of the efficient market hypothesis would lead us to believe. Further, he argued that only those who can trade at low commission rates(2-3 percent round trip) might be able to profit from it.

Dyl (1977) found that securities which had declined substantially from their levels early in the year tended to trade in abnormally high year-end volumes while the volume of those which had appreciated substantially relative to the market, were below average. He also found, however, that neither a major selloff of appreciated stocks nor substantial repurchasing of depreciated stocks sold for tax purposes occurred in January.

Including American Stock Exchange stocks in their sample, Branch and Ryan (1980) still found that stocks reaching year-end lows performed better than the market in

the following January. And, moreover, they showed that first-of-the-year performance for year-end AMEX lows was substantially superior to the performance of the NYSE year-end lows. This finding might be interpreted as supporting the small firm effect.

Conducting the same test for 1979-1983, Branch and Chang (1984) found that unlike the 1965-1978 findings, 1979-1983 first-of-the-year return of the NYSE and AMEX stocks reaching year-end lows were generally modestly nonpositive. Considering that not all year-end lows are depressed by tax-loss selling and many issues under tax-loss selling pressure do not reach lows at year-end, they observed the abnormal January returns for those issues with the largest December declines. Studying the stocks included in the Price, Dividend and Earinings tape, they found that the AMEX and the OTC December decliners tended to do significantly better than the NYSE issues in January.

Givoly and Ovadia (1983) found that , due to the tax induced sales, the price of many stocks over the 1945-1979 period was temporarily depressed in December but recovered in the following January, and that price recovery was the major contributor to the high returns observed in January. They also found modestly high returns in November, December and March . They found the lowest return in June. They argued that tax effect was present in firms of all sizes but much more pronounced for small firms. They implied,

however, that tax induced sales might be the sole contributor to the high January return.

Reinganum and Shapiro (1983) tested the tax-loss selling hypothesis for the stocks on the London Stock Exchange. Like others who studied the international evidence, they found strong seasonality in January and April. They concluded that they had found a tax effect. Unlike the U.S., however, a strong tax effect was detected even among the largest, publicly traded U.K. firms.

Brown, Keim, Kleidon and Marsh (1983) analyzed the returns to Australian stocks, since the typical fiscal year-end for tax purposes is June 30 in Australia. Using monthly data from 1958 to 1981, they found that average returns to most Australian stocks were substantially larger in January and July than in the other ten months. They concluded that tax-loss selling probably could not explain the January effect found for U.S. stocks.

Korajczyk (1982), using value weighted stock market indicies from eighteen countries with widely varying tax regimes and tax year-ends, found evidence of January seasonal in stock returns for each country (except Spain) over the period of January 1973 to January 1982. Gultekin and Gultekin (1983) also studied the seasonality in stock index retruns of 17 countries. With some reservations, Gultekin and Gultekin interpreted their findings as providing support for the tax-loss selling hypothesis.

Berges, McConnell and Schlarbaum (1984) studied Canadian stocks over the 1951-1980 period. They found that January stock returns exceeded retruns for other months of the year. Canada did not, however, introduce a capital gains tax until 1973. They, however, reported that January returns in Canada exceeded returns for other months of the year before and after this date. Thus, they concluded that tax-loss selling hypothesis could not explain the entire turn-of-the-year effects in stock returns.

Constantinides (1984) provided another study about the personal taxes and abnormal January returns. He simulated four different scenarios assuming different tax rates and transactionaction costs. He demonstrated that with transaction costs creating a friction to trading, tax-loss selling should gradually increase from December to January and suddenly cease in the first few days of January. Since the stocks sold for tax-loss purposes would experience increases in their prices when the tax-loss selling pressure is over in the following January, rational tax-loss sellers should repurchase different stocks sold by other tax-loss sellers at about the same time. This activity should not depress the price of either one of the stocks. That is, if investors realize that the tax-loss selling pressures are persistent and they could make profits, they would bid up the prices before the end of the year and returns after January first would not be

significantly positive. Thus, he concluded that tax-loss selling in the presence of transaction costs predicts a seasonal pattern in stock prices only if we assume irrationality or ignorance on behalf of investors.

Summary of the Tax-Loss Selling Studies

The first logical explanation for the January effect was the tax-loss selling hypothesis. Stocks that have been depressed during the year would be good candidates for the tax-loss selling and they would bounce back when the tax-loss selling pressure is over in the following January. The tax-loss selling hypothesis seems to be supported with international evidence. More recent studies, however, question whether the tax-loss selling hypothesis alone can explain the entire January effect.

Size Effect Studies

Using a methodology similar to Fama and MacBeth (1973), Banz (1981) found a negative association between average risk-adjusted returns to stocks and the market value of stocks. The t-statistic for whether the 'size effect' coefficient equals zero was -2.54 for the 1936-1975

period, and it was -1.88 and -1.91 for the 1936-1955 and 1956-1975 subperiods, respectively. He argued that the size effect was not linear in the market value and the main effect occurred for very small firms while average sized and large sized firms' returns differed little.

Reinganum (1981) investigated 566 NYSE and AMEX stocks that had fiscal year-end in December. He found that portfolios based on firm size or earnings/price (E/P) ratios experienced average returns systematically different from those predicted by the CAPM. He concluded that the equilibrium pricing model was misspecified.

Roll (1981) suggested that since the stocks of small firms are traded less frequently than the stocks of larger firms, estimates of systematic risk from daily stock returns would be biased downward thereby causing their risk-adjusted average returns to be overestimated. Both Roll (1981) and Reinganum (1982), however, concluded that the bias in risk estimation due to non-synchronous trading could not explain the magnitude of the risk-adjusted average returns of the small firms.

Christie and Hertzel (1981) argued that the size effect could be due to non-stationarity in the risk measures. The risk of the stock of a levered firm increases as the stock value decreases. Historical estimates that assumes risk is constant over time understate the risk of levered stocks whose value had

fallen; hence, average risk-adjusted returns for stocks with low current values should be positive because risk was underestimated. Nevertheless, adjusting for this bias in risk estimates did not eliminate the size effect.

Levy (1978) and Mayshar (1981) said that at least a partial explanation for the small firm effect could be found in the misspecification of the Sharpe-Lintner CAPM. While the Sharpe-Lintner CAPM assumes complete diversification for all investors, transaction costs and other barriers to trade limit the investor diversification. Thus, when risk was measured with the Sharpe-Lintner CAPM, the risk-adjusted returns would be distorted by the inappropriate risk measure. Roll (1983) also conjectured that variance was more closely related to the abnormal returns of small firms than was systematic risk.

Lakonishok and Shapiro (1982) tested this hypothesis that shares of small firms, which generally were not widely held, were affected more by their own variances than were the widely held shares of large firms. Using monthly data for the period of 1962-80, they rejected the hypothesis that total risk, as opposed to systematic risk, was more important for small firms. They concluded that neither the traditional measure of risk (beta) nor the alternative risk measure (variance) explain the cross sectional variation in returns. They saw that size was the only thing that mattered.

Pari and Chen (1982), using mean-adjusted return method by Cornell (1979), found that all risk premiums were captured and impounded in the mean or expected return for secutities traded on the NYSE, AMEX and the OTC market. No portfolio, including the portfolio consisting of the smallest market value of equity firms, demonstrated significantly positive unexpected returns. They concluded that the small firm effect was not the result of any market inefficiency. Rather it appeared to be a direct result of the misassessment of risk by current forms of asset pricing model.

Arbel and Strebel (1983) reported that firms which were relatively neglected by security analysts exhibted superior market performance compared with those that were intensively researched. Since small firms are less likely to be pursued by security analysts, they checked the interaction of the neglected firm effect with firm size. They reported that the neglected firm effect persisted over and above the samll firm effect. They concluded that the underlying factor associated with better performances of small firms were related to information availability rather than size.

Keim (1983) provided new evidence on the time series behavior of the size effect over the period of 1963 to 1979. Keim noted that the average risk adjusted return to a portfolio of small firms' stocks was large in January and

much smaller for the rest of the year. Nearly 50% of the annual size effect occurred in January and more than 26% of the size premium was attributable during the first week of trading in the year and almost 11% was attributable to the first trading day. Howerer, he admitted that the hypothesis advanced to explain the size effect appeared unable to explain the January effect.

Brown, Kleidon and Marsh (1983) also examined the behavior of the size effect over time. Using data from 1967-79, they found that the risk adjusted average return to portfolios ranked on size were linearly related to the logarithm of the size variable because of the skewness in the distribution of firm size, but the magnitude and the sign of that relation were not constant within the 1967-79 sample period. In particular, the size effect seemed to imply a negative excess returns for small firms' stocks between 1969-73 and a positive excess return between 1974-79. They speculated about the types of explanations that were consistent with a time-varying size effect, but found no explanations that seemed likely to fit both Keim's (1983) evidence and their own. They concluded that different estimation methodology could lead to different conclusions about the size effect.

Summary of the Size Effect Studies

While the size effect has been extensively studied, the conclusions are not so clear. Some found a strong size effect only in January, while others found a size effect throughout the year. Some found a time invariant size effect, while others did not. Some found that the correction of the biased risk measures could eliminate the size effect, while some did not. Different measures of risk did not seem to explain the size anomaly. The asset pricing model might be misspecified. Although few could give a clear explanations for the size effect, most agree that firm size and the January effect are strongly associated.

What Causes the Effect?

In his attempt to connect the turn-of-the-year effect with the size effect, Roll (1983) found that most of the abnormal returns for small firms occurred on the last trading day of December and the first four trading days of the following January. Although later days in January also displayed significant small firm premia, no mean difference on a later trading day in January was as large as the mean return differences on the first four days. He also found a

positive small firm return difference on the last day of December. Thus, he argued that the average returns of small firms are invariably greater than the average returns of large firms. In the explanation of some possible spurious causes of the turn-of-the-year effect, he showed that the pattern could not be explained by data errors, new listings, de-listings or outliers. He found most of the large turn-of-the-year returns were on extremely low-priced stocks, many of which were selling for less than two dollars a share. He concluded that the pattern is closely related to tax-loss selling induced by negative returns over the previous year.

Reinganum (1983) examined the extent to which the January size effect could be explained by the tax-loss selling pressure hypothesis. Like Roll (1983), he found that the magnitude of the price increase in the first week of January was positively related to the magnitude of short-term capital losses that could have been realized at the end of the previous year. Roll (1983) conjectured that the effect was largest for small firms because small firms' stock returns were more volatile, and because tax-exempt investors had relatively small holdings in small firms' stocks. On the other hand, Reinganum found that average stock returns were high during the first five trading days of the calendar year, even for stocks that show capital gains over the previous year. He also found that average

returns to small firms' stocks were high relative to the larger firms'stocks for the entire month of January. The difference was not limited to the first five trading days. Thus, Reinganum concluded that the January size effect could not be completely explained by tax-loss selling.

Brown, Keim, Kleidon and Marsh (1983) analyzed the returns to Australian stocks and reported that the size effect did not appear to be seasonal because the average return to the smallest decile to stocks was about 4% per year greater than any of the other size portfolios and this difference did not seem to vary across months. Thus, while stock returns were seasonal in Australia, as noted previously by Officer (1975), the size effect was not obviously related to the end of the tax year. They concluded that tax-loss selling probably could not explain the January size effect found in the U.S. data.

Givoly and Ovadia (1983) argued that a tax effect was present in firms of all sizes but much more pronounced for small firms. Nevertheless, they implied that the tax-induced sales were the sole contributor to the high January return.

In their test of the tax-loss selling hypothesis for stocks on the London Stock Exchange, Reinganum and Shapiro (1983) found a strong tax effect even among the largest, publicly traded U.K. firms. While Keim (1981) noted that small firm returns during the month of January were

significantly larger than large firm returns and that the difference was not as large during other months. Cook and Rozeff (1981) found no size effect in non-January months.

Strock (1984) simultaneously examined the relationship between the January effect, size effect and neglected firm effect. Using a sample of 270 firms in the S&P 500 Index, she studied the relationships for five years from 1976 to 1980. She found that the neglected firm effect and the small firm effect are seperate effects and there is a strong interaction between the neglected and January effect.

Summary of the Possible Causes

While some researchers found a size effect throughout the year, most found the size effect only in January. Moreover they seemed to agree that the tax-loss selling hypothesis could explain part of the abnormal January returns, but not all of them. The size effect seemed to be over and above the tax-loss selling effect.

Size and Other Anomalies

In their examination of the joint relationship between

returns and size, dividend yield, co-skewness and January seasonal, Cook and Rozeff (1982) found the negative size and positive dividend yield effect. They reported that in specifying linear regression model both log of market value and size decile were better measures of size than the relative market proportion of Banz' measure. Their results showed that both the size and dividend yield effects appeared to have significant interactions with the month of January and the co-skewness appeared to be a surrogate for dividend yield. They found no size effect in non-January months.

The dividend yield effect has been an open issue because of the mixed empirical evidence. Although Litzenberger and Ramaswamy (1979) found a strong positive effect of yield on risk-adjusted returns, Morgan (1980) found only a weak effect (which he suggested was due to nonstationarity); Black and Scholes (1974) found no significant effect whatsoever, and Long (1978) found a negative effect in a very careful study with unusual data not subject to the infrequency of trading problem. And Blume (1979) found a positive relation between dividend yield and risk-adjusted return except for stocks which paid no dividends at all. This zero dividend group also had high average excess returns after adjustment for CAPM beta risk and the overall relationship between dividend yield and excess return was lopsided U.

Reinganum (1981) investigated 566 NYSE and AMEX stocks that had fiscal year-ends in December. He found that portfolios based on firm size or earnings/price (E/P) ratios experienced average returns systematically different from those predicted by the CAPM. He concluded that the equilibrium model was misspecified. He found, however, 'After controlling returns for any E/P effect, a strong firm size effect still emerged. But after controlling returns for any market value effect, a seperate E/P effect was not found.' Thus, Reinganum concluded that the size effect subsumed the evidence of Basu (1977), who found that stocks with high earnings/price (E/P) ratios had higher average risk adjusted returns than low E/P stocks.

While Reinganum argued that the size effect subsumed the E/P effect, Basu (1983) re-examined Reinganum's results with a different sample period and a different procedure for creating portfolios of stocks ranked on both size and E/P ratios. Basu also used a variety of procedures to control for risk and found that returns to stocks of firms with low market values were higher than the returns to the stocks of large firms. In one of his tests, Basu sorted stocks into portfolios with different E/P ratios but similar market values and concluded that high E/P stocks earn statistically significant positive risk adjusted returns. On the other hand, when stocks were sorted into portfolios with different market values but similar E/P

ratios, Basu found no significant risk adjusted returns related to market value for the 1963-80 period. Thus, Basu's results seemed to contradict Reinganum's (1981) conclusion that the size effect subsumed the E/P effect. Finally, Basu noted that size tended to interact with E/P ratios in the sense that the magnitude of risk adjusted returns was largest for small firms with high E/P ratios. Basu concluded that both the E/P effect and the size effect probably were an indication of deficiencies in the capital asset pricing model, not a sign of market inefficiency.

Peavy and Goodman (1983) also tested the significance of E/P ratios for portfolio returns. They found that after controlling for firm size, industry effects and infrequent trading, high E/P ratio stocks provide superior risk-adjusted returns than low E/P ratio stocks.

Suspecting the contradiction in the studies of Reinganum (1981) and Basu (1983), Cook and Rozeff (1983) examined the issue using an array of experimental methods. They found three main effects and two related interaction effects at work that help to explain risk-adjusted returns. The main effects were the January, size and E/P ratio effects while the interactions were market value (size) with January and E/P ratio with January. They found that both the size and E/P ratio effects were operative throughout all months of the year; approximately half of each effect occurred in January and the other half occurred

in the rest of the year. They concluded that neither size subsumed E/P ratio nor E/P ratio subsumed size as have been claimed.

Link (1980) examined empirically the relationship between innovative activity, as measured by the rate of return to research and development expenditures, and firm size using a sample of firms from the chemicals and allied products industry. He found that efficient innovative activity is a function of firm size. The estimated rate of return in the larger size grouping was significantly greater than for the samller firms.

Bergen (1978) suggested using the ratio of stock prices to per share R&D spending as a growth potential index. Since 1974 firms had been required to disclose such expenditures. Bergen claimed relative R&D spending was an excellent first screen when combined with other fundamental factors. Branch (1973, 1974) studied seven manufacturing industries and found a significant causal relationship from R&D to subsequent profit and sales growth. Doyle and Navratil (1981) suggested that the market pays a premium for a high R&D intensity.

Summary of the Other Anomalies

With diverse empirical evidence, researchers reported different results regarding the stock market anomalies. Dividend yield, E/P ratio , information availability and R&D expenditures are some of the anomalies that still need to be studied further.

Abnormal Returns to Small Firms

Roll (1983) examined the effects of different portfolio strategies implicit in alternative estimators of risk-adjusted returns to portfolios of small firm's stocks. He showed that the annualized arithmetic average daily risk-adjusted returns calculated by Reinganum (1981) were about twice as large as the risk- adjusted returns to a portfolio that was purchased at the beginning of the year and held for an entire year. The use of compounded arithmetic average returns was similar to a portfolio strategy that involves daily rebalancing to attain equal weights for the stocks in the portfolio. On the other hand, a buy-and-hold strategy involves no rebalancing within the measurement interval. Since the magnitude of the size effect was apparently sensitive to the technique used, Roll questioned the empirical importance of this

phenomenon.

Blume and Stambaugh (1983) also questioned the same phenomenon. They said that the bid-ask spread effect produced negative first-order autocorrelation in recorded price changes for individual stocks. Thus, the use of quoted closing prices in computing returns on individual stocks imparted an upward bias (see Chapter V). They showed that the bid-ask bias in the computed daily returns was significant for small firms, while it was negligible for the stocks of large firms. Like Roll (1983), they argued that computed return on a buy-and-hold portfolio largely avoids the bid-ask bias due to a 'diversification' effect. They also found that based on buy-and-hold daily returns, the full year size effect was half as large as previously reported using rebalanced returns, and, on average, all of the size effect was due to the month of January.

Stoll and Whaley (1983) examined the magnitude of transaction costs for stocks of firms in different size categories. They examined monthly returns to NYSE listed stocks from 1960 through 1979 for ten portfolios ranked on the market value of the stock. They noted that samll firms' stocks tended to have lower prices and higher bid-ask spreads, so transaction costs were relatively high for these stocks. The portfolio of small firms had an average bid-ask spread of 2.93 percent for 1960-79 and an

average commission rate of 1.92 percent. The round trip transaction costs would amount to 2.93 + 2 x 1.92 = 6.77 percent. The comparable figure for the largest firm portfolio was 2.57 percent. Stoll and Whaley estimated risk-adjusted returns to the small firm portfolio net of transaction costs and found that a round trip transaction every three months was sufficient to eliminate the size effect. If round trip transactions occurred once per year, the average abnormal return was about 4.5 percent per year after transaction costs with a t-statistic of 1.75.

Schultz (1983) examined daily returns to NYSE and AMEX stocks from 1963 through 1979. Since AMEX stocks generally have lower market values than NYSE-listed stocks, most of the firms in the smallest decile portfolio were listed on the AMEX. Consistent with the results of Stoll and Whaley (1983), Schultz found the average round trip transaction costs for the small firm portfolio were almost 11.4 percent. Nevertheless, for holding periods of one year, the small firm portfolio earned average risk-adjusted returns of about 31 percent per year net of transaction costs. This size effect had a t-statistic of 2.8. Schultz also estimated average transaction costs for each month and found no evidence of seasonality that could explain the January size effect found by others. Therefore, Schultz concluded that transaction costs could not explain the high average returns to small firms' stocks.

James and Edmister (1983) tried to explain the size effect in terms of a liquidity premium associated with inactively traded shares. Tinic (1972) and Demsetz (1968) have argued that transaction costs vary inversely with trading activity. Since in equilibrium the risk-adjusted expected returns net of transaction costs should be equated across all securities, an inverse relationship between transaction costs and trading activity provides an economic justification for a liquidity premium for inactively traded shares. The higher risk-adjusted returns observed for small firms might simply reflect higher transaction costs associated with inactively traded firms. They found that trading activity and firm size were highly correlated. No significant differences in mean daily risk-adjusted returns were, however, observed between portfolios of the most actively traded firms (as measured by average daily trading volume or number of days traded) and portfolios of the least actively traded firms. No evidence was found consistent with existence of a liquidity premium for small firms' stocks.

Reinganum (1981) tested the size effect in the framework of arbitrage pricing theory (APT). Since APT offers a parametric alternative to the simple one-period CAPM, it should account for empirical anomalies that arise within the CAPM. He reported that portfolios of small firms earn on average 20% per year more than portfolios of

larger firms, even after controlling for APT risk. The result was detected regardeless of whether APT risk was measured with a three-, four-, or five-factor model.

Chen (1981, 1983), contrary to Reinganum, found that the size effect was essentially captured by the factor loadings of the APT. Portfolios consisting of firms of different sizes did not have significantly different returns after adjusting for factor risks. His result was consistent with the hypothesis that risk is the explanation for the size effect while the market is efficient.

Linking five macroeconomic variables to factors, Chan, Chen and Hsieh (1983) explored the feasibility of a pricing equation based on the APT as an explanation of the firm size effect. Growth rate of industrial production, change in expected inflation rate, unanticipated inflation rate, the difference between the return of a portfolio of long term government bond and the T-Bill rate and the spread of yield between low grade and high grade bonds were the five macroeconomic variables they wanted to link to the factors. They found that changing business conditions, which were measured as the spread of yield between low and high grade bonds, could explain a large portion of the size effect. They concluded that firm size anomaly was essentially captured by a multifactor pricing model and the higher average return of small firms was justified by the additional risk borne in an efficient market.

Summary of the Size Effect Explanations

Different techniques of calculating risk-adjusted return, bid-ask spread, transaction costs and liquidity premiums could not explain the whole size effect. Even using a different asset pricing model yielded different results between researchers. The size effect is still an anomaly that needs more study.

Chapter Summary

The literature surrounding abnormal January returns is rather abundant. However, the search for a fully satisfactory explanation of this anomaly has been unsuccessful. Tax-loss selling pressure and a size effect have been the major proposed explanations for the anomaly. Some argued that the tax-loss selling hypothesis could not explain the entire January effect. Some argued that transaction costs and appropriate risk adjustment would get rid of the abnormal returns to the small firms. Others argued that the asset pricing model was misspecified. Few, however, casts a doubt on the efficiency of the capital market.

Recently, Schwert (1984) said that the January size effect would join the weekend effect as an empirical

anomaly. French (1980) and Gibbons and Hess (1981) found that average returns to stocks were negative from the close of trading on Friday to the close of trading on Monday. While these anomalies were statistically significant, they had not been explained using conventional economic models.

Up to now, most researchers agree that the January effect is still an anomaly while the market maintains its efficiency.

C H A P T E R III

PRELIMINARY STUDY

As discussed in the previous chapter, most of the early January return studies focused on the tax-loss selling hypothesis. After some researchers concluded that the tax-loss selling hypothesis could not explain the entire January returns (see Reinganum (1983) and Roll (1983)), the focus shifted to the size effect hypothesis. Although small firms showed more pronounced effects, as Givoly and Ovadia (1984) noted, tax-induced sales might still be the sole contributor to the high January return. Constantinides (1984) argued that tax-loss selling could occur throughout the year, although it increases throughout the year and suddenly ceases in the first few days of the next January.

This preliminary study first surveys the behavior of stocks that are most likely to be the candidates for the tax-loss selling in each month of the year.

I used the 1982 and 1983 version of the COMPUSTAT Price-Dividend-Earnings (PDE) tapes. From these data, I created a monthly returns file inclusive of dividends from

February 1970 through January 1983. Since the data in the PDE tapes have already been adjusted for all capital changes, the retrieved data were readily usable. The sample contained all the stocks in the PDE tape that have complete monthly price and dividend data in a given month. The number of stocks in the monthly return file created ranged from 2008 in 1970 to 4800 in 1983. The average monthly return (arithmetic mean) of all stocks in each exchange markets and other submarkets during the period is shown in Table III-1.

As with other studies (Officer (1975), Rozeff and Kinney (1976), Gultekin and Gultekin (1983)), Table III-1 shows that January is the month of the largest return for any submarkets. Using aggregate returns on the New York Stock Exchange for the January 1904 - December 1974 period, Rozeff and Kinney (1976) found abnormally high January returns. Table III-1 seems to extend their results for a different time period.

Table III - 1

Average Monthly Returns of the Submarkets

	ALL	NYSE	AMEX	OTC	REG	Non-NAS
JAN	.102	.060	.140	.133	.127	.180
	(20.400)	(60.000)	(20.000)	(8.870)	(5.770)	(3.530)
FEB	.007	.004	.018	.003	.011	.013
	(7.000)	(4.000)	(9.000)	(3.000)	(1.100)	(1.630)
MAR	.014	.013	.017	.012	.000	.038
	(14.000)	(13.000)	(8.500)	(4.000)	(0.000)	(2.380)
APR	.011	.002	.002	.027	-.007	.025
	(11.000)	(2.000)	(1.000)	(13.500)	(-.880)	(1.140)
MAY	-.002	-.008	-.009	.007	.006	.019
	(-2.000)	(-8.000)	(-4.500)	(7.000)	(.430)	(1.730)
JUN	.005	.005	.003	.004	.018	.018
	(5.000)	(5.000)	(1.500)	(2.000)	(1.800)	(2.250)
JUL	.013	.011	.013	.016	-.006	.016
	(13.000)	(11.000)	(6.500)	(8.000)	(-.860)	(1.450)
AUG	.012	.012	.010	.012	-.002	.029
	(12.000)	(12.000)	(5.000)	(6.000)	(-.250)	(2.230)
SEP	-.003	-.002	-.002	-.004	.001	-.016
	(-3.000)	(-2.000)	(-1.000)	(-4.000)	(.080)	(-2.290)
OCT	.001	-.004	-.014	.014	.006	.055
	(1.000)	(-4.000)	(-7.000)	(7.000)	(.460)	(3.930)
NOV	.021	.022	.011	.027	.022	.000
	(21.000)	(22.000)	(5.500)	(13.500)	(2.200)	(0.000)
DEC	.014	.015	.006	.013	-.002	.089
	(14.000)	(15.000)	(3.000)	(6.500)	(-.220)	(1.710)

t-values are in the parenthesis.
REG means Regional Exchange Markets.
Non-NAS means Non-NASDAQ stocks.

An equally weighted index of all the stocks in the file was used as the market index throughout this preliminary study. The validity of using this index as the market proxy was tested by performing a correlation analysis with other market related indicies. Table III-2 shows the correlation coefficients of PDE index with the Dow Jones Industrial, S&P 500 and NYSE composite indicies.

Table III - 2

Pearson Correlation Coefficients of Market Indicies

PDE	1.0000			
DJI	.7483	1.0000		
SP500	.7480	.8594	1.0000	
NYSE	.8307	.9143	.8642	1.0000
	PDE	DJI	SP500	NYSE

All the coefficients are significant at the 99.9 % level.

Since the indicies' correlations are at least moderately high, they all should generate similar market differential (mean deviation) returns and systematic risks.

Although Table III-1 shows a significant January effect for the 1970-1982 period, some information may be lost when results are reported in such an aggregated form. To determine whether the return behavior of stocks is stable over time, year by year comparision of the returns are computed for each submarket and shown in Table III-3

through Table III-8. Table III-3 contains the return to all the stocks in the sample from 1970-1982. Table III-4 through Table III-8 show the returns to the stocks in each submarkets.

For Table III-3, during the 13 years studied, years 1973, 1978 and 1982 have negative January returns. Except for 1977, no other month has higher positive returns than January. A similar pattern is observed for the each submarket (Table III-4 through Table III-8). While NYSE stocks (Table III-4) show negative January returns in six of twelve years, the other submarkets show only two or three negative January returns. The AMEX stocks (Table III-5) always outperform the NYSE stocks in January and most of the other months. Since most AMEX stocks are for smaller companies than those of NYSE stocks, this result might be interpreted as indirect evidence of the size effect. For different time periods, AMEX and OTC stocks each outperforms the other.

To check the return behavior of the possible tax-loss selling candidates, stocks are ranked by the magnitude of return at month t and then partitioned into ten portfolios of approximately equal numbers of stocks. The first portfolio consists of the 10% of the stocks that have the lowest return at month t. The second portfolio consists of the 10% of the stocks that have the next lowest return at t. Thus, the tenth portfolio consists of the 10% of the stocks that have the highest returns at month t.

Table III-3

Monthly Returns for ALL Stocks

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1970	0.000	.028	-.018	-.154	-.100	-.051	.055	.058	.105	-.043	.004	.079
	(0.000)	(24.000)	(-6.000)	(-77.000)	(-50.000)	(-17.000)	(18.880)	(19.330)	(35.000)	(-14.440)	(2.000)	(26.330)
1971	.140	.049	.060	.040	-.041	-.017	-.044	.037	-.015	-.052	-.030	.115
	(20.000)	(16.330)	(20.000)	(13.330)	(-20.500)	(-8.500)	(-22.000)	(18.500)	(-7.500)	(-26.000)	(-15.000)	(38.330)
1972	.099	.051	.009	.012	-.010	-.033	-.027	.011	-.028	-.016	.042	-.010
	(24.750)	(17.000)	(4.500)	(6.000)	(-5.000)	(-16.500)	(-13.500)	(5.500)	(-14.000)	(-8.000)	(21.000)	(-5.000)
1973	-.038	-.072	-.029	-.072	-.079	-.038	.118	-.043	.083	.003	-.184	-.037
	(-19.000)	(-36.000)	(-14.500)	(-36.000)	(-39.500)	(-19.000)	(39.330)	(-21.500)	(27.670)	(1.000)	(-92.000)	(-12.330)
1974	.168	.006	.002	-.059	-.074	-.035	-.054	-.088	-.091	.102	-.057	-.082
	(5.600)	(3.000)	(1.000)	(-29.500)	(-37.000)	(-17.500)	(-27.000)	(-44.000)	(-45.500)	(25.500)	(-28.500)	(-27.330)
1975	.314	.051	.084	.037	.077	.076	-.020	-.052	-.044	.023	.022	-.008
	(44.860)	(17.000)	(28.000)	(12.330)	(25.670)	(25.330)	(-10.000)	(-26.000)	(-22.000)	(11.500)	(11.000)	(-4.000)
1976	.210	.105	.018	-.014	-.023	.026	-.003	-.022	.014	-.024	.025	.099
	(35.000)	(26.250)	(6.000)	(-7.000)	(-11.500)	(13.000)	(-1.500)	(-11.000)	(7.000)	(-12.000)	(12.500)	(33.000)
1977	.028	-.007	.010	.013	-.001	.053	.001	-.012	.005	-.003	.075	.014
	(9.330)	(-3.500)	(2.500)	(6.500)	(-.500)	(26.500)	(.500)	(-6.000)	(2.500)	(-16.500)	(36.500)	(7.000)
1978	-.020	.020	.067	.083	.068	.003	.055	.096	-.004	-.195	.042	.007
	(-4.000)	(10.000)	(33.500)	(27.670)	(34.000)	(1.500)	(27.500)	(24.000)	-2.000	-97.500	21.000	3.500
1979	.100	-.023	.069	.025	-.015	.052	.016	.078	-.007	-.108	.066	.066
	(25.000)	(-11.500)	(34.500)	(12.500)	(-7.500)	(17.330)	(8.000)	(39.000)	(-3.500)	(-54.000)	(33.000)	(22.000)
1980	.204	-.006	-.176	.046	.069	.043	.110	.071	.044	.038	.066	-.040
	(6.375)	(-2.000)	(-88.000)	(23.000)	(34.500)	(21.500)	(36.670)	(23.670)	(14.670)	(12.670)	(22.000)	(-20.000)
1981	.091	.004	.076	.026	.034	-.007	-.019	-.066	-.091	.074	.015	-.006
	(3.500)	(2.000)	(19.000)	(8.670)	(11.330)	(-1.750)	(-6.330)	(-22.000)	(-45.500)	(12.330)	(7.500)	(-.550)
1982	-.016	-.050	-.003	.051	-.020	-.038	-.018	.063	.025	.136	.088	.025
	(-5.330)	(-25.000)	(-.500)	(10.200)	(-10.000)	(-19.000)	(-9.000)	(21.000)	(8.330)	(34.000)	(22.000)	(8.330)
ALL	.102	.007	.014	.011	-.002	.005	.013	.012	-.003	.001	.021	.014
	(20.400)	(7.000)	(14.000)	(11.000)	(-2.000)	(5.000)	(13.000)	(12.000)	(-3.000)	(1.210)	(21.000)	(14.000)

t-values are in the parenthesis

Table III-4

Monthly Returns for NYSE Stocks

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1970	0.000	.045	-.015	-.140	-.092	-.056	.074	.059	.091	-.039	.028	.086
	(0.000)	(15.000)	(-7.500)	(46.670)	(-30.670)	(-18.670)	(24.670)	(19.670)	(22.750)	(-13.000)	(9.330)	(28.670)
1971	.098	.032	.060	.034	-.138	-.006	-.044	.045	-.006	-.050	-.019	.112
	(32.670)	(16.000)	(20.000)	(11.330)	(-69.000)	(-3.000)	(-22.000)	(15.000)	(-3.000)	(-25.000)	(-9.500)	(37.330)
1972	.066	.037	.006	.010	-.005	-.033	-.022	.023	-.025	-.004	.168	-.010
	(22.0000)	(12.330)	(3.000)	(5.000)	(-2.500)	(-16.500)	(-11.000)	(7.670)	(-12.500)	(-2.000)	(56.000)	(-5.000)
1973	-.052	-.065	-.026	-.068	-.062	-.032	-.526	.108	-.036	.098	-.005	-.175
	(-26.000)	(-32.500)	(-13.000)	(-34.000)	(-20.670)	(-10.670)	(-1.150)	(27.000)	(-18.000)	(32.670)	(-1.670)	(-58.330)
1974	-.011	.008	-.015	-.062	-.069	-.037	-.052	-.089	-.092	.126	-.041	-.062
	(-3.670)	(2.670)	(-5.000)	(-31.000)	(-34.500)	(-12.330)	(-17.330)	(-29.670)	(-30.670)	(25.200)	(-13.670)	(-20.670)
1975	.278	.043	.074	.360	.074	.076	-.044	-.042	-.043	.041	.031	-.008
	(39.710)	(10.750)	(18.500)	(12.000)	(18.500)	(25.330)	(-14.670)	(-21.000)	(-21.500)	(13.670)	(10.330)	(-4.000)
1976	.186	.066	.013	-.018	-.018	.041	-.002	-.015	.021	-.027	.030	.089
	(46.500)	(16.500)	(6.500)	(-9.000)	(-9.000)	(21.000)	(-1.000)	(-7.500)	(10.500)	(-13.500)	(15.000)	(29.670)
1977	-.003	-.016	.001	.012	-.006	.062	-.011	-.015	0.000	-.035	.075	.005
	(-1.000)	(-8.000)	(.500)	(6.000)	(-3.000)	(31.000)	(-5.500)	(-7.500)	(0.000)	(17.500)	(37.500)	(2.500)
1978	-.042	.005	.060	.079	.050	-.008	.058	.070	-.016	-.176	.045	.005
	(-21.000)	(2.500)	(30.000)	(39.500)	(16.670)	(-4.000)	(29.000)	(23.330)	(-8.000)	(-58.670)	(22.500)	(2.500)
1979	.081	-.033	.084	.012	-.015	.047	.025	.077	-.012	-.105	.073	.044
	(27.000)	(-16.500)	(28.000)	(6.000)	(-7.500)	(15.670)	(12.500)	(38.500)	(-6.000)	(-52.500)	(24.330)	(14.670)
1980	.063	-.031	-.142	.056	.074	.033	.098	.040	.023	.016	.057	-.027
	(15.750)	(-15.500)	(-47.330)	(28.000)	(37.000)	(16.500)	(32.670)	(13.330)	(11.500)	(5.330)	(19.000)	(-13.500)
1981	-.012	.017	.077	.013	.020	-.013	-.023	-.070	-.072	.066	.035	-.025
	(-4.000)	(8.500)	(25.670)	(4.330)	(10.000)	(-6.500)	(-11.500)	(-35.000)	(-36.000)	(22.000)	(17.500)	(-12.500)
1982	-.029	-.041	-.008	.044	-.038	-.028	-.022	.109	.018	.132	.071	.011
	(-14.500)	(-20.500)	(-4.000)	(22.000)	(-19.000)	(-14.000)	(-11.000)	(36.330)	(9.000)	(44.000)	(23.670)	(3.670)
ALL	.060	.004	.013	.002	-.008	.005	.011	.012	-.002	-.004	.002	.015
	(60.000)	(4.000)	(13.000)	(2.000)	(-8.000)	(5.000)	(11.000)	(12.000)	(-2.000)	(-4.000)	(22.000)	(15.000)

t-values are in the parenthesis

Table III-5

Monthly Returns for AMEX Stocks

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1970	0.000	.003	-.030	-.199	-.108	-.060	.021	.060	.160	-.071	-.048	.027
	(0.000)	(.500)	(-3.330)	(-39.800)	(-21.600)	(-10.000)	(3.000)	(8.570)	(20.000)	(-11.830)	(-9.600)	(10.290)
1971	.199	.082	.069	.037	-.049	-.035	-.065	.024	-.003	-.068	-.049	.116
	(22.110)	(11.710)	(9.860)	(5.290)	(-8.170)	(-7.000)	(-13.000)	(4.800)	(-.500)	(-17.000)	(-9.800)	(16.570)
1972	.196	.071	.003	.002	-.031	-.136	-.041	-.011	-.037	-.036	.024	-.018
	(14.000)	(10.140)	(.600)	(.400)	(-6.200)	(-27.200)	(-10.250)	(-2.200)	(-9.250)	(-9.000)	(4.800)	(-3.600)
1973	-.019	-.080	-.032	-.085	-.111	-.040	.141	-.060	.055	.016	-.195	-.082
	(-3.170)	(-16.000)	(-6.400)	(-17.000)	(-22.200)	(-8.000)	(20.140)	(-12.000)	(9.170)	(2.670)	(-32.500)	(-13.670)
1974	.210	0.000	.022	-.050	-.082	-.032	-.046	-.080	-.089	.072	-.068	-.110
	(19.090)	(0.000)	(3.670)	(-10.000)	(-20.500)	(-8.000)	(-9.200)	(-16.000)	(-17.800)	(9.000)	(-11.330)	(-18.330)
1975	.368	.071	.099	.032	.079	.081	.017	-.070	-.043	-.004	.008	-.014
	(23.000)	(7.890)	(12.380)	(4.570)	(9.870)	(11.570)	(2.830)	(-17.500)	(-10.750)	(-.800)	(1.330)	(-2.330)
1976	.262	.168	.017	-.028	-.031	.003	-.006	-.032	.009	-.027	.011	.113
	(21.830)	(21.000)	(2.830)	(-7.000)	(-6.200)	(.600)	(-1.500)	(-8.000)	(1.800)	(-5.400)	(2.200)	(18.830)
1977	.004	-.003	.008	.009	0.000	.062	.005	-.017	.006	-.032	.083	.020
	(.570)	(-.600)	(1.600)	(2.250)	(0.000)	(12.400)	(1.250)	(-4.250)	(1.500)	(-8.000)	(16.600)	(5.000)
1978	.004	.032	.084	.089	.088	.001	.055	.139	.008	-.242	.068	-.005
	(.670)	(8.000)	(16.800)	(14.830)	(14.670)	(2.000)	(11.000)	(12.640)	(1.600)	(-48.400)	(13.600)	(-1.250)
1979	.113	-.016	.097	.033	-.015	.056	.003	.085	-.006	-.103	.074	.081
	(16.140)	(-4.000)	(16.170)	(6.600)	(-3.000)	(9.330)	(.750)	(17.000)	(-1.200)	(-25.750)	(14.800)	(13.500)
1980	.243	-.007	-.204	.053	.071	.038	.120	.101	.042	.040	.055	-.047
	(4.500)	(-1.400)	(-51.000)	(10.600)	(14.200)	(7.600)	(8.570)	(16.830)	(8.400)	(8.000)	(9.170)	(-9.400)
1981	.069	-.003	.095	.026	.041	-.001	-.032	-.082	-.106	.074	.010	-.033
	(1.640)	(-.750)	(15.830)	(5.200)	(8.200)	(-.200)	(-8.000)	(-20.500)	(-26.500)	(12.330)	(2.500)	(-8.250)
1982	-.015	-.057	-.010	.043	-.015	-.040	-.017	.058	.018	.152	.111	.014
	(-3.000)	(-14.250)	(-1.670)	(10.750)	(-5.000)	(-8.000)	(-3.400)	(11.600)	(3.600)	(21.710)	(13.880)	(2.800)
ALL	.140	.018	.017	.002	-.009	.003	.013	.010	-.002	-.014	.011	.006
	(20.000)	(9.000)	(8.500)	(1.000)	(-4.500)	(1.500)	(6.500)	(5.000)	(-1.000)	(-7.000)	(5.500)	(3.000)

t-values are in the parenthesis

Table III-6

Monthly Returns for OTC Stocks

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1970	0.000	0.000	-.012	-.033	-.115	-.011	.035	.047	.072	-.010	-.004	.067
	(0.000)	(0.000)	(-2.000)	(-19.000)	(-19.170)	(-1.570)	(5.000)	(6.710)	(8.000)	(-1.430)	(-.670)	(9.570)
1971	.216	.058	.050	.062	-.038	-.024	-.020	.026	-.004	-.044	-.037	.125
	(4.800)	(7.250)	(7.140)	(10.330)	(-7.600)	(-4.800)	(-4.000)	(5.200)	(-.800)	(-8.800)	(-7.400)	(15.625)
1972	.081	.064	.022	.250	.001	-.027	-.023	.008	-.024	-.022	.017	-.003
	(10.125)	(10.570)	(4.400)	(5.000)	(.200)	(-5.400)	(-5.750)	(2.000)	(-6.000)	(-5.500)	(4.250)	(-.600)
1973	-.023	-.074	-.031	-.066	-.080	-.046	.113	-.042	.077	.010	-.187	-.046
	(-4.600)	(-18.500)	(-7.750)	(-16.500)	(-20.000)	(-11.500)	(16.140)	(-10.500)	(12.830)	(1.430)	(-37.400)	(-7.670)
1974	.243	.006	.017	-.060	-.073	-.035	-.062	-.091	-.089	.087	-.070	-.089
	(2.150)	(1.200)	(3.400)	(-15.000)	(-18.250)	(-8.750)	(-12.400)	(-22.750)	(-17.800)	(12.430)	(-14.000)	(-17.800)
1975	.328	.053	.084	.044	.081	.072	-.008	-.053	-.042	.015	.020	-.004
	(19.290)	(7.570)	(10.500)	(6.290)	(11.570)	(12.000)	(-1.600)	(-13.250)	(-10.500)	(3.000)	(3.330)	(-.800)
1976	.189	.119	.028	.004	-.026	.011	-.003	-.021	.006	-.016	.270	.105
	(23.625)	(14.875)	(4.700)	(.800)	(-6.500)	(2.750)	(-.600)	(-5.250)	(1.500)	(-4.000)	(5.400)	(17.500)
1977	.036	.005	.027	.019	.008	.034	.015	0.000	.012	-.030	.063	.026
	(5.140)	(1.250)	(1.930)	(3.800)	(1.600)	(8.500)	(3.750)	(0.000)	(3.000)	(-5.000)	(12.600)	(6.500)
1978	-.019	.032	.067	.086	.081	.019	.530	.104	.003	-.190	.024	.170
	(-4.750)	(8.000)	(16.750)	(14.330)	(16.200)	(3.800)	(10.600)	(14.860)	(.750)	(-47.500)	(6.000)	(4.250)
1979	.110	-.018	.190	.133	-.016	.052	.018	.077	-.001	-.116	.055	.078
	(12.220)	(-6.000)	(38.000)	(33.250)	(-4.000)	(10.400)	(4.500)	(15.400)	(-.025)	(-38.670)	(13.750)	(15.600)
1980	.297	.014	-.192	.035	.067	.052	.118	.083	.051	.055	.079	-.048
	(4.070)	(2.800)	(-64.000)	(8.750)	(16.750)	(13.000)	(23.600)	(16.600)	(12.500)	(11.000)	(13.170)	(-12.000)
1981	.186	-.008	.071	.040	.036	-.014	-.020	-.082	-.112	.086	.004	-.019
	(3.260)	(-2.000)	(14.200)	(8.000)	(7.200)	(-1.560)	(-4.000)	(-27.330)	(-37.330)	(7.170)	(1.000)	(-4.750)
1982	-.014	-.058	-.001	.058	-.014	-.048	-.020	.042	.037	.135	.100	.035
	(-3.500)	(-14.500)	(-.077)	(11.600)	(-3.500)	(-16.000)	(-5.000)	(10.500)	(7.400)	(22.500)	(14.290)	(5.830)
ALL	.133	.003	.012	.027	.007	.004	.016	.012	-.004	.014	.027	.013
	(8.870)	(3.000)	(4.000)	(13.500)	(7.000)	(2.000)	(8.000)	(6.000)	(-4.000)	(7.000)	(13.500)	(6.500)

t-values are in the parenthesis

Table III-7

Monthly Returns for Regional Stocks

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1970	0.000	.012	-.042	-.181	-.100	-.053	.105	.073	.106	-.049	-.009	.071
	(0.000)	(.520)	(-2.630)	(-5.660)	(-2.860)	(-1.130)	(3.180)	(2.280)	(3.210)	(-1.960)	(-.360)	(3.380)
1971	.116	.017	.060	.041	-.017	-.012	-.063	.169	.023	-.030	-.026	.109
	(3.740)	(1.210)	(2.070)	(1.320)	(-.630)	(-.600)	(-3.500)	(2.760)	(.790)	(-1.430)	(-1.240)	(5.740)
1972	.058	.036	-.012	-.029	.008	-.072	-.027	-.013	-.018	-.017	.041	-.026
	(2.420)	(1.890)	(-.500)	(-1.710)	(.360)	(-3.600)	(-1.125)	(-.500)	(-.780)	(-.890)	(1.520)	(-1.240)
1973	-.068	-.090	-.040	-.089	-.101	-.051	.108	-.064	.114	-.047	-.256	-.036
	(-3.400)	(-6.430)	(-2.000)	(-5.240)	(-5.050)	(-3.400)	(3.060)	(-3.600)	(4.560)	(-2.610)	(-10.670)	(-1.200)
1974	.153	-.014	-.036	-.092	-.134	-.083	-.044	-.039	-.107	.091	-.077	-.160
	(4.370)	(-.700)	(-1.440)	(-4.000)	(-6.380)	(-3.190)	(-1.830)	(-4.630)	(-3.240)	(2.170)	(-2.850)	(-6.960)
1975	.487	-.058	.178	-.023	.052	.068	-.062	-.080	-.076	-.025	.038	-.006
	(-5.090)	(-1.660)	(4.450)	(-.530)	(1.370)	(2.270)	(-2.070)	(-4.710)	(-4.000)	(.780)	(1.190)	(-.170)
1976	.243	.227	-.032	-.036	-.041	.023	.017	-.061	0.000	-.053	.068	.081
	(7.360)	(5.160)	(-1.140)	(-1.500)	(-1.780)	(.880)	(.550)	(-3.050)	(0.000)	(-2.520)	(1.890)	(3.120)
1977	.157	-.011	-.015	-.003	-.005	.040	.034	-.058	.131	-.039	.129	-.046
	(1.170)	(-.610)	(-.360)	(-.140)	(-1.400)	(1.380)	(.870)	(-1.320)	(.900)	(-1.700)	(3.000)	(-1.700)
1978	-.016	.033	.029	.097	.039	.021	.001	.100	.005	-.227	-.034	.002
	(-.470)	(.970)	(1.610)	(3.460)	(1.560)	(1.000)	(.060)	(3.230)	(.200)	(-9.460)	(-1.000)	(.060)
1979	.092	0.000	.113	.031	.022	.136	-.040	.041	-.028	-.060	.064	.113
	(4.180)	(0.000)	(2.900)	(1.550)	(.920)	(.020)	(-2.220)	(1.950)	(-1.560)	(-2.070)	(2.130)	(3.420)
1980	.256	.034	-.209	.022	.017	.104	.056	.110	.121	.071	.043	-.076
	(3.320)	(1.310)	(-8.360)	(.880)	(.740)	(3.590)	(2.710)	(4.230)	(2.520)	(2.450)	(2.050)	(-3.450)
1981	.094	.033	.079	-.013	.131	-.034	-.050	-.095	-.108	.039	-.009	-.032
	(1.130)	(.890)	(3.760)	(-.620)	(1.640)	(-2.270)	(-2.780)	(-6.330)	(-4.320)	(1.770)	(-.560)	(-1.520)
1982	-.005	-.058	-.024	.003	-.033	0.000	-.026	0.000	-.017	.165	.107	.002
	(-.290)	(-1.930)	(-1.200)	(.100)	(-1.290)	(0.000)	(-1.530)	(0.000)	(-.770)	(2.290)	(2.680)	(.060)
ALL	.127	.011	0.000	-.007	.006	.018	-.006	-.002	.001	.006	.022	-.002
	(5.770)	(1.100)	(0.000)	(-.880)	(.430)	(1.800)	(-.860)	(-.250)	(.080)	(.460)	(2.200)	(-.220)

t-values are in the parenthesis

Table III-8

Monthly Returns for Non-NASDAQ Stocks

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1970	0.000	-.001	-.075	-.178	-.106	-.065	.057	.129	.046	-.026	-.052	.044
	(0.000)	(-.030)	(-2.500)	(-5.240)	(-3.210)	(-1.270)	(1.240)	(3.390)	(.790)	(-.870)	(-2.000)	(1.330)
1971	.231	.014	.032	.026	-.046	-.103	-.037	.044	-.038	.001	-.063	.149
	(4.440)	(.390)	(1.070)	(1.530)	(-2.000)	(-3.680)	(-1.090)	(1.570)	(-1.150)	(.025)	(-1.800)	(3.550)
1972	.125	.059	-.002	.022	-.049	-.059	-.030	-.021	-.056	-.022	.047	-.008
	(5.000)	(1.690)	(-.050)	(.650)	(-2.580)	(-1.970)	(-2.140)	(-.910)	(-4.310)	(-.630)	(2.040)	(-.400)
1973	-.039	-.061	-.049	-.112	-.091	-.067	.151	-.059	.062	-.058	-.197	-.056
	(-.710)	(-2.440)	(-3.500)	(-6.590)	(-4.550)	(-3.530)	(5.030)	(-2.900)	(2.380)	(-2.760)	(-7.580)	(-2.000)
1974	.245	.021	.022	-.048	-.093	0.000	-.118	-.107	-.086	.051	-.126	-.135
	(2.880)	(.640)	(.960)	(-1.780)	(-4.230)	(0.000)	(-5.360)	(-4.860)	(-3.310)	(1.700)	(-5.040)	(-3.460)
1975	.291	.052	.092	.065	.094	.102	-.014	-.052	-.067	-.009	-.047	-.006
	(4.040)	(1.790)	(2.140)	(1.710)	(2.410)	(3.400)	(-.440)	(-1.860)	(-3.190)	(-.260)	(-1.310)	(-.190)
1976	.676	.205	.074	.014	.008	.025	-.046	-.077	-.001	-.077	-.016	.144
	(1.740)	(2.160)	(.970)	(.670)	(.170)	(.690)	(-2.710)	(-3.670)	(-.040)	(-3.080)	(-.800)	(2.120)
1977	-.050	.052	-.064	-.017	-.021	.063	.083	-.005	-.038	-.031	-.018	.031
	(-.850)	(1.130)	(-2.000)	(-.520)	(-.680)	(2.250)	(1.770)	(-.200)	(-1.900)	(-.910)	(-.780)	(1.110)
1978	.594	.004	.123	.057	.019	.011	.026	.540	.521	-.138	-.067	-.050
	(.960)	(.290)	(1.860)	(1.425)	(.610)	(.290)	(.720)	(2.250)	(.810)	(-5.520)	(-1.630)	(-1.320)
1979	.626	.066	.055	.006	-.065	-.013	-.028	.015	-.029	-.112	.075	-.033
	(1.630)	(1.530)	(.900)	(.210)	(-2.600)	(-.370)	(-1.220)	(.380)	(-.600)	(-3.610)	(.910)	(-1.320)
1980	1.509	-.062	-.198	.040	.088	.107	-.027	.028	-.009	-.075	-.047	-.017
	(1.480)	(-2.140)	(-2.410)	(1.740)	(1.800)	(1.620)	(-.330)	(.875)	(-.310)	(-.710)	(-1.020)	(-.440)
1981	.873	.027	.065	.018	.048	.046	.030	.062	-.028	.049	.016	.179
	(.800)	(1.800)	(1.710)	(1.290)	(2.180)	(2.875)	(1.200)	(2.210)	(-2.800)	(1.810)	(1.140)	(1.410)
1982	.015	-.025	.018	.059	.017	-.006	.010	.031	.003	.123	.022	.050
	(.680)	(-2.500)	(2.250)	(.980)	(.940)	(-.550)	(.910)	(1.940)	(.200)	(5.860)	(2.000)	(3.130)
ALL	.180	.013	.038	.025	.019	.018	.016	.029	-.016	.055	0.000	.890
	(3.530)	(1.630)	(2.380)	(1.140)	(1.730)	(2.250)	(1.450)	(2.230)	(-2.290)	(3.930)	(0.000)	(1.710)

t-values are in the parenthesis

The returns of portfolios constructed at month t are calculated for t+1 and compared with the corresponding market return without any specific risk-adjustment. Risk-adjusted comparisions are discussed in Chapter IV. Table III-9 shows the overall results of this return comparision. Each cell in the table contains two numbers. The first one is the market differential return at the month following the portfolio construction, t+1, the second one in the parenthesis is the t-statistic showing how significantly the differential return differs from zero. Thus, the entry .156 for portfolio HD1 in the January column indicates that those portfolios that declined most severely in December have, on average, earned a 15.6% higher return than the market in the following January. Its t-statistic is 5.2, which means the market differential return is different from zero at the 99% significance level. The other numbers can be interpreted in the same way.

Table III-9 shows that losers of one month (Portfolio HD1) consistently outperform the market in the following month, while the winners of one month (Portfolio HD10) are consistently outperformed by the market in the following month. For Portfolio HD1, the market excess returns ranged from .2% in February to 15.6% in January. For Portfolio HD10, the market excess return ranged from -1.1% in November to -2.6% in July. Portfolio HD2, which is the

Table III-9

Market Differential Returns for the Portfolios

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
HD 1	.156	.002	.036	.020	.016	.022	.029	.027	.022	.031	.022	.037
	(5.200)	(.670)	(12.000)	(6.670)	(5.330)	(7.330)	(7.250)	(6.750)	(7.330)	(5.170)	(5.500)	(9.250)
HD 2	.014	-.016	.012	.002	.003	.006	.012	-.001	.004	.011	.001	.003
	(2.330)	(-6.000)	(6.000)	(1.000)	(1.500)	(3.000)	(6.000)	(-.500)	(2.000)	(5.500)	(.500)	(1.500)
HD 3	-.017	-.008	.090	.002	0.000	.003	.005	.002	.004	.005	.003	.003
	(-4.250)	(-4.000)	(4.500)	(1.000)	(0.000)	(1.500)	(2.500)	(1.000)	(2.000)	(2.500)	(1.500)	(1.500)
HD 4	.034	-.009	0.000	.001	-.002	.001	.004	.002	.002	-.002	-.002	-.004
	(1.260)	(-4.500)	(0.000)	(.500)	(-.670)	(.500)	(2.000)	(1.000)	(1.000)	(-1.000)	(-1.000)	(-2.000)
HD 5	-.028	-.009	.005	0.000	-.001	-.001	-.003	-.003	-.001	.003	.002	.009
	(-9.330)	(-4.500)	(1.250)	(0.000)	(-.500)	(-.500)	(-1.500)	(-1.500)	(-.500)	(1.500)	(1.000)	(.750)
HD 6	-.027	-.009	-.002	.007	.001	-.003	0.000	-.005	-.001	0.000	-.006	-.004
	(-5.400)	(-4.500)	(-.500)	(1.400)	(.500)	(-1.500)	(0.000)	(-2.500)	(-.500)	(0.000)	(-3.000)	(-2.000)
HD 7	-.017	-.004	.006	-.004	-.002	-.001	-.003	.002	-.001	-.004	-.002	-.006
	(-1.420)	(-2.000)	(-.860)	(-2.000)	(-1.000)	(-.500)	(-1.500)	(1.000)	(-.500)	(-2.000)	(-1.000)	(-3.000)
HD 8	-.045	-.010	-.005	.002	0.000	-.006	-.008	-.002	-.001	-.009	-.004	-.011
	(-15.000)	(-5.000)	(-2.500)	(1.000)	(0.000)	(-3.000)	(-4.000)	(-1.000)	(-.500)	(-4.500)	(-2.000)	(-5.500)
HD 9	-.051	-.008	-.006	-.005	-.002	-.007	-.010	-.005	-.002	-.013	-.003	-.010
	(-25.500)	(-2.670)	(-3.000)	(-2.500)	(-1.000)	(-3.500)	(-5.000)	(-2.500)	(-1.000)	(-4.330)	(-1.500)	(-5.000)
HD10	-.019	-.024	-.021	-.018	-.012	-.012	-.026	-.016	-.020	-.023	-.011	-.019
	(-1.900)	(-8.000)	(-7.000)	(-6.000)	(-4.000)	(-3.000)	(-8.670)	(-5.300)	(-10.000)	(-7.670)	(-3.670)	(-6.330)
ALL	.102	.007	.014	.011	-.002	.005	.013	.012	-.003	.001	.021	.014
	(20.400)	(7.000)	(14.000)	(11.000)	(-2.000)	(5.000)	(13.000)	(12.000)	(-3.000)	(1.000)	(21.000)	(14.000)

t-values are in the parenthesis

second lowest return portfolio at month t, outperformed the market in 10 out of 12 months. Portfolio HD9, which is the second highest return portfolio at month t, was outperformed by the market in all 12 months. Except for January, Portfolio HD10 is outperformed by Portfolio HD9. The number of months that outperform the market decreases as we move from Portfolio HD1 to Portfolio HD10. Portfolio HD5 and HD6, which lie in the middle of the 10 portfolios, exhibit returns which approximate the market except in January and February.

Table III-9 seems to suggest that the losers of one month have a greater chance of beating the market, while the gainers of one month tend to be outperformed by the market in the following month. The stocks that equal the market return at month t continue earning the market return on average in the following month, too. Portfolio HD1, Portfolio HD2 and Portfolio HD4 show positive differential returns in January while the others show negative returns. The market differential return of Portfolio HD1 is particularly high and statistically greater than zero --- this might be interpreted as supporting Givoly and Ovadia's (1983) conclusion that tax-induced sales are the sole contributor to the high January returns.

Stocks that experience big losses in one month are more likely to be tax-loss selling candidates in subsequent months. Thus, the persistent positive differential returns

of Portfolio HD1 throughout the 12 months supports Constantinides' (1984) conclusion that tax-loss selling occurs throughout the year although it suddenly ceases in the first few days of January. The negative differential returns of Portfolio HD9 and Portfolio HD10 are, however, left unexplained. The number of negative differential returns increases from Portfolio HD1 to Portfolio HD10. The differential returns are not statistically significant for the middle portfolios. The returns of the portfolios are closer to the mean as we move toward the middle groups.

Table III-9 like Table III-1 contains aggregated result. The year-by-year comparision of returns to each portfolio are shown in Table III-10 through Table III-21.

For the year-by-year comparision of monthly market differential returns, Portfolio HD1 does not always outperform the market in every month of the year. During the 13 years studied, only in January, March, August and December, does Portfolio HD1 consistently outperformed the market. While Portfolio HD10 has been outperformed by the market consistently only in July during the same period. Like Table III-9, differential returns among months other than January do not differ very much. Only the January differential return for Portfolio HD1 is signficantly larger than the differential returns of other months.

Table III-10

Market Differential Returns for January Portfolio

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
HD 1	.004	.017	-.008	.010	.065	.037	.027	.014	.011	.010	-.013	-.025
	(.500)	(1.889)	(-.889)	(1.111)	(5.417)	(2.313)	(1.588)	(2.333)	(1.833)	(.833)	(-1.444)	(-2.780)
HD 2	-.003	.001	-.011	.005	.035	-.047	.002	0.000	.011	-.015	-.016	-.005
	(-.500)	(.143)	(-1.833)	(.714)	(4.375)	(-6.714)	(.333)	(0.000)	(1.833)	(-2.500)	(-3.200)	(-.830)
HD 3	-.013	-.012	-.005	.016	.031	-.034	.009	-.001	.009	.005	.001	-.011
	(-1.625)	(-1.714)	(-1.000)	(2.286)	(3.875)	(-3.778)	(1.500)	(-.200)	(2.250)	(.560)	(.200)	(-2.200)
HD 4	-.010	-.012	.004	.016	.007	-.022	-.006	-.002	.001	.002	0.000	.004
	(-1.667)	(-2.000)	(.800)	(2.286)	(.875)	(-2.444)	(-1.500)	(-.400)	(.250)	(.222)	(0.000)	(.800)
HD 5	.002	-.008	-.013	.004	-.002	-.017	0.000	-.002	-.001	-.014	.002	.012
	(.182)	(-1.333)	(-1.778)	(.667)	(-.250)	(-1.700)	(0.000)	(-.400)	(-.250)	(-2.800)	(.400)	(3.000)
HD 6	-.006	-.006	.015	.006	-.016	-.003	-.003	-.009	-.007	-.015	.011	.015
	(-.857)	(-.857)	(3.000)	(.857)	(-2.286)	(-.300)	(-.600)	(-2.250)	(-1.750)	(-3.000)	(1.571)	(1.670)
HD 7	-.002	-.007	.013	0.000	-.007	-.002	.003	-.010	-.001	.002	.013	.027
	(-.286)	(-1.000)	(2.167)	(0.000)	(-.700)	(-.200)	(.600)	(-2.000)	(-.200)	(.286)	(2.600)	(3.380)
HD 8	0.000	-.005	.018	-.004	-.024	.012	.002	-.014	-.019	-.006	.001	.016
	(0.000)	(-.625)	(3.600)	(-.500)	(-2.400)	(1.200)	(.286)	(-2.800)	(-3.800)	(-.857)	(.200)	(4.000)
HD 9	-.002	-.013	.011	-.010	-.003	.013	-.008	.006	-.011	.001	.005	.009
	(-.250)	(-1.625)	(1.571)	(-1.429)	(-.176)	(1.182)	(-1.143)	(1.000)	(-2.200)	(.125)	(.833)	(1.800)
HD10	.004	-.004	-.004	-.040	-.078	.037	-.010	-.004	-.034	-.015	-.014	-.019
	(.333)	(-.308)	(-.500)	(-4.000)	(-6.500)	(2.846)	(-1.000)	(-.444)	(-4.857)	(-1.667)	(-2.000)	(-2.710)
ALL	.046	.046	-.088	.006	.052	.102	-.005	.018	-.027	-.010	.003	-.048
	(15.330)	(15.330)	(-44.000)	(3.000)	(17.330)	(34.000)	(-1.670)	(9.000)	(-13.500)	(-3.330)	(1.500)	(-24.000)

t-values are in the parenthesis

Table III-11

Market Differential Returns for February Portfolio

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
HD 1	.017	.025	.011	.035	.046	.120	.042	.031	.014	.082	.002	.014	.037
	(.897)	(2.270)	(1.220)	(3.890)	(4.600)	(8.000)	(4.200)	(3.100)	(1.556)	(7.455)	(.286)	(1.273)	(2.850)
HD 2	-.004	-.002	.004	.007	.024	.030	.012	.002	.005	.052	.031	-.007	-.005
	(-.571)	(-.250)	(.800)	(1.000)	(3.000)	(2.727)	(2.000)	(6.667)	(.833)	(7.429)	(5.167)	(-1.000)	(-.630)
HD 3	.005	.003	.009	.001	.008	0.000	.024	-.008	-.008	.048	.038	.005	-.010
	(.830)	(.375)	(1.500)	(.143)	(1.333)	(0.000)	(2.400)	(-1.600)	(-1.600)	(8.000)	(7.600)	(.714)	(-1.670)
HD 4	-.003	.001	0.000	0.000	-.011	-.002	-.005	-.004	-.018	.031	.033	-.002	-.020
	(-.043)	(8.000)	(0.000)	(0.000)	(-2.200)	(-.154)	(-.833)	(-.800)	(-3.600)	(5.167)	(6.600)	(-.400)	(-3.330)
HD 5	.009	0.000	.003	-.007	-.008	-.034	.001	-.010	.027	.027	.016	.024	-.004
	(1.500)	(0.000)	(.500)	(-1.400)	(-1.600)	(-4.250)	(.143)	(-2.500)	(2.700)	(4.500)	(3.200)	(.800)	(-.800)
HD 6	.011	-.019	-.002	-.009	.019	-.021	.001	.039	-.022	.024	.002	-.015	-.018
	(1.830)	(-2.710)	(-.333)	(-1.800)	(2.111)	(-2.625)	(.143)	(1.026)	(-4.400)	(4.000)	(.400)	(-1.000)	(-4.500)
HD 7	.009	-.006	.006	-.004	-.005	-.025	-.017	-.015	-.001	.035	.008	-.004	.057
	(1.500)	(-.670)	(1.000)	(-.800)	(-1.000)	(-3.125)	(-2.429)	(-3.000)	(-.167)	(3.500)	(1.333)	(-.667)	(1.020)
HD 8	-.006	-.001	-.005	.002	-.020	-.027	-.005	-.014	-.003	.021	-.007	.001	-.004
	(-1.000)	(-.125)	(-.833)	(.500)	(-3.333)	(-3.375)	(-.560)	(-2.800)	(-.500)	(3.500)	(-1.400)	(.167)	(-.500)
HD 9	-.016	-.006	-.010	-.007	-.016	-.004	-.008	-.011	.013	.035	-.045	-.002	-.012
	(-2.670)	(-.667)	(-1.429)	(-1.167)	(-2.286)	(-.333)	(-1.000)	(-1.833)	(1.857)	(5.000)	(-7.500)	(-.333)	(-2.400)
HD10	-.043	-.005	-.017	-.020	-.034	-.040	-.044	-.013	-.003	.044	-.078	-.012	-.024
	(-6.140)	(-.450)	(-2.125)	(-3.333)	(-4.857)	(-3.636)	(-4.400)	(-1.444)	(-.375)	(4.000)	(-11.143)	(-1.333)	(-3.000)
ALL	-.018	.060	.009	.029	.002	.084	.018	.010	.067	.069	-.176	.076	-.003
	(-6.000)	(20.000)	(4.500)	(-14.500)	(1.000)	(28.000)	(6.000)	(2.500)	(33.500)	(34.500)	(-88.000)	(19.000)	(-.500)

t-values are in the parenthesis

Table III-12

Market Differential Returns for March Portfolio

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
HD 1	-.072	.042	.004	0.000	-.002	.049	-.076	.020	.031	.024	.054	.023	.024
	(-9.000)	(3.500)	(.444)	(0.000)	(-.286)	(3.769)	(-.562)	(2.000)	(2.583)	(2.667)	(5.400)	(1.643)	(1.850)
HD 2	-.027	.002	-.002	-.007	.015	.006	-.885	-.001	-.006	-.010	.040	-.001	0.000
	(-3.857)	(.286)	(-.333)	(-1.167)	(2.500)	(.750)	(-1.443)	(-.167)	(-1.000)	(-2.250)	(4.444)	(-.143)	(0.000)
HD 3	-.023	-.005	.001	.006	-.010	-.006	-.941	-.005	0.000	.013	.016	-.003	.007
	(-3.286)	(-.833)	(.143)	(1.000)	(-1.667)	(-.857)	(-1.328)	(-1.000)	(0.000)	(1.625)	(2.286)	(-.273)	(1.170)
HD 4	.004	-.001	-.008	.008	0.000	.016	-.445	-.004	-.014	-.006	.011	.003	0.000
	(.500)	(-.143)	(-1.333)	(1.600)	(0.000)	(1.455)	(-.662)	(-1.000)	(-2.800)	(-1.500)	(1.571)	(.375)	(0.000)
HD 5	.010	-.003	-.004	.011	.006	.005	2.456	-.006	-.008	-.004	-.007	-.002	-.004
	(1.429)	(-.375)	(-.667)	(1.833)	(1.200)	(.714)	(1.991)	(-1.500)	(-1.333)	(-.800)	(-1.400)	(-.400)	(-.750)
HD 6	.021	-.004	.001	.016	.006	0.000	.600	.011	.002	.006	-.010	-.007	.044
	(3.000)	(-.500)	(.167)	(3.200)	(.857)	(0.000)	(.839)	(1.222)	(.333)	(1.200)	(-.200)	(-1.167)	(1.020)
HD 7	.047	-.012	.001	.004	.003	.004	-.307	-.008	-.003	-.018	-.015	-.002	-.019
	(7.833)	(-1.714)	(.167)	(.667)	(.600)	(.444)	(-.490)	(-1.600)	(-.600)	(-3.600)	(-3.000)	(-.333)	(-3.800)
HD 8	.031	-.004	0.000	.004	0.000	.012	-.691	.002	.011	-.001	-.015	.003	.002
	(5.167)	(-.500)	(0.000)	(.800)	(0.000)	(1.200)	(-1.699)	(.400)	(1.571)	(-.167)	(-3.000)	(.429)	(.400)
HD 9	.019	-.010	-.003	-.010	.007	-.015	-.189	-.004	.006	.001	-.011	-.009	-.010
	(2.714)	(-1.250)	(-.429)	(-.167)	(1.167)	(-2.667)	(-.595)	(-.667)	(.750)	(.125)	(-2.200)	(-1.500)	(-1.670)
HD10	-.007	-.001	.007	-.033	-.020	-.069	-.032	-.005	-.018	-.005	-.007	.001	-.044
	(-1.000)	(-.111)	(1.000)	(-4.714)	(-2.857)	(-6.900)	(-.863)	(-.625)	(-2.250)	(-.200)	(-1.000)	(.091)	(-4.000)
ALL	-.154	.040	.012	-.072	-.059	.037	-.014	.013	.083	.025	.046	.026	.051
	(-77.000)	(13.330)	(6.000)	(-36.000)	(-29.500)	(12.330)	(-7.000)	(6.500)	(27.670)	(12.500)	(23.000)	(8.670)	(10.200)

t-values are in the parenthesis

Table III-13

Market Differential Returns for April Portfolio

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
HD 1	.001	.006	0.000	-.005	-.013	.043	-.004	.010	.048	-.305	-.288	.022	.020
	(.100)	(.667)	(0.000)	(-.556)	(-1.625)	(3.071)	(-.571)	(1.111)	(4.364)	(-2.115)	(-2.427)	(1.833)	(2.000)
HD 2	.003	.006	0.000	-.002	.006	.010	0.000	.011	-.013	-.400	.700	.007	.005
	(.444)	(1.000)	(0.000)	(-.222)	(1.000)	(1.000)	(0.000)	(1.000)	(-2.167)	(-.986)	(1.608)	(.538)	(.830)
HD 3	-.009	.002	-.006	-.009	.003	-.001	-.008	-.001	.003	.106	-.461	-.022	.008
	(-1.286)	(.333)	(-1.200)	(-1.500)	(.500)	(-.111)	(-1.333)	(-.250)	(.375)	(.112)	(-.917)	(-4.400)	(2.000)
HD 4	-.007	-.011	-.002	-.005	-.036	-.011	-.004	0.000	-.012	-1.963	1.021	-.016	.031
	(-.875)	(-2.200)	(-.333)	(-.833)	(-2.125)	(-1.571)	(-.800)	(0.000)	(-2.000)	(-2.765)	(.158)	(-3.200)	(1.820)
HD 5	-.006	.002	.006	-.006	-.009	.001	-.004	.007	-.008	.213	.396	-.018	.007
	(-.857)	(.400)	(1.000)	(-1.000)	(-1.800)	(.100)	(-.800)	(1.167)	(-1.333)	(.090)	(.728)	(-2.000)	(1.170)
HD 6	-.001	.004	.011	.006	.004	-.020	.003	.003	-.020	.737	-.128	.014	-.007
	(-.167)	(.571)	(1.833)	(1.000)	(.667)	(-2.857)	(.500)	(.600)	(-3.333)	(1.295)	(-1.558)	(.875)	(-1.750)
HD 7	.009	-.004	-.001	.006	0.000	-.006	.004	.002	-.007	.540	.056	-.013	-.005
	(1.500)	(-.667)	(-.167)	(1.200)	(0.000)	(-.600)	(.667)	(.400)	(-1.167)	(.771)	(.095)	(-2.600)	(-1.000)
HD 8	.010	-.001	-.001	.015	.001	-.012	.008	-.006	-.001	-.593	-.563	.004	-.006
	(2.000)	(-.167)	(-.167)	(3.000)	(.143)	(-1.333)	(1.600)	(-1.000)	(-.111)	(-1.031)	(-1.171)	(.571)	(-1.200)
HD 9	.009	.009	.008	.018	.010	-.013	.004	-.002	.006	.053	-.328	-.003	-.017
	(1.800)	(1.500)	(1.143)	(3.000)	(2.000)	(-1.444)	(.667)	(-.400)	(.750)	(.178)	(-.994)	(-.667)	(-3.400)
HD10	-.006	-.012	-.011	-.014	-.004	.007	-.003	-.023	.006	-.120	-.103	.027	-.042
	(-1.000)	(-1.500)	(-1.571)	(-2.000)	(-.500)	(.583)	(-.375)	(-3.286)	(.600)	(-2.688)	(-1.975)	(2.077)	(-6.000)
ALL	-1.000	-.041	-.010	-.079	-.074	.077	-.023	-.001	.068	-.015	.069	.034	-.020
	(-50.000)	(-20.500)	(-5.000)	(-39.500)	(-37.000)	(25.670)	(-11.500)	(-.500)	(34.000)	(-7.500)	(34.500)	(11.330)	(-9.990)

t-values are in the parenthesis

Table III-14

Market Differential Returns for May Portfolio

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
HD 1	.054	-.011	.011	.025	.024	.037	.019	.021	.035	.032	.034	.010	.007
	(4.500)	(-1.556)	(1.556)	(2.778)	(2.667)	(3.364)	(2.375)	(2.333)	(3.182)	(2.462)	(3.400)	(.769)	(.780)
HD 2	.014	.002	-.011	.013	.005	.016	.004	.013	.011	.015	.009	.005	-.012
	(1.556)	(.286)	(-1.833)	(1.857)	(.714)	(1.600)	(.571)	(1.857)	(2.200)	(1.500)	(1.500)	(.833)	(-2.400)
HD 3	.005	-.003	-.003	-.003	.004	.008	.004	-.004	.006	.005	.017	.001	.001
	(.625)	(-.500)	(-.600)	(.429)	(.667)	(1.000)	(.571)	(-.667)	(1.000)	(.714)	(1.545)	(.200)	(.170)
HD 4	-.003	.015	-.008	.001	-.002	.013	.002	0.000	.009	-.012	.002	.007	-.003
	(-.429)	(2.500)	(-1.333)	(.158)	(-.333)	(1.444)	(.333)	(0.000)	(1.286)	(-1.714)	(.500)	(1.400)	(-.750)
HD 5	.003	.010	-.007	-.011	-.010	.007	.003	-.007	-.006	-.012	-.005	.016	.004
	(.429)	(1.667)	(-1.400)	(-1.833)	(-1.667)	(1.000)	(.600)	(-1.750)	(-1.200)	(-2.400)	(-1.000)	(1.778)	(1.000)
HD 6	-.001	0.000	-.005	0.000	.003	.007	-.008	-.009	-.016	-.010	-.009	.004	.003
	(-.143)	(0.000)	(-1.000)	(0.000)	(.500)	(1.000)	(-1.600)	(-1.125)	(-3.200)	(-2.000)	(-1.800)	(.800)	(.430)
HD 7	-.006	-.002	.009	-.008	-.007	-.002	-.005	.002	-.013	-.008	0.000	-.002	.023
	(-.856)	(-.400)	(1.500)	(-1.600)	(-1.400)	(-.222)	(-.556)	(.400)	(-2.167)	(-1.000)	(0.000)	(-.400)	(2.300)
HD 8	-.013	-.001	-.006	-.002	-.005	-.018	-.007	-.009	-.009	-.012	-.004	-.012	.007
	(-1.856)	(-.200)	(-1.200)	(-.400)	(-1.000)	(-2.571)	(-1.750)	(-2.250)	(-1.286)	(-2.400)	(-.667)	(-2.400)	(1.400)
HD 9	-.016	.011	.002	0.000	-.005	-.020	.005	0.000	-.013	-.007	-.007	-.028	-.001
	(-2.286)	(1.375)	(.333)	(0.000)	(-.833)	(-2.222)	(.833)	(0.000)	(-1.857)	(-1.000)	(-1.000)	(-4.667)	(-.200)
HD10	-.034	-.018	.020	-.012	-.011	-.046	-.012	-.003	-.001	.010	-.033	.003	-.026
	(-3.778)	(-2.250)	(2.222)	(-1.714)	(-1.833)	(-4.182)	(-1.714)	(-.375)	(-.091)	(1.000)	(-4.125)	(.086)	(-3.710)
ALL	-.051	-.017	-.033	-.038	-.035	.076	.026	.053	.003	.052	.043	-.007	-.038
	(-17.000)	(-8.500)	(-16.500)	(-19.000)	(-17.500)	(25.330)	(13.000)	(26.500)	(1.500)	(17.330)	(21.500)	(-1.750)	(-19.000)

t-values are in the parenthesis

Table III-15

Market Differential Returns for June Portfolio

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
HD 1	.037	-.003	-.016	.127	.022	.043	.029	.024	.025	.005	.068	.026	.003
	(3.083)	(-.429)	(-2.286)	(10.583)	(2.444)	(4.778)	(2.900)	(3.000)	(2.083)	(.625)	(2.720)	(2.889)	(.270)
HD 2	.027	.008	-.007	.070	.006	.015	.004	-.003	.015	.006	.033	.002	-.005
	(2.700)	(1.143)	(-1.000)	(5.833)	(.856)	(2.143)	(.800)	(-.600)	(2.143)	(1.000)	(4.125)	(.333)	(-.710)
HD 3	.006	-.005	.008	.032	.005	.017	.007	.006	.016	.008	.001	-.013	-.005
	(.667)	(-.833)	(1.333)	(3.200)	(.833)	(2.428)	(1.400)	(1.200)	(2.286)	(1.600)	(.143)	(-2.600)	(-.830)
HD 4	.010	.005	.004	.003	.012	.020	.041	.007	-.007	.001	.009	-.004	-.012
	(1.111)	(.833)	(.667)	(.333)	(1.714)	(2.500)	(2.333)	(1.400)	(-1.400)	(.125)	(.900)	(-.800)	(-2.400)
HD 5	.001	.005	.009	-.032	0.000	-.002	.002	.007	-.015	.003	-.007	-.007	-.001
	(.125)	(2.400)	(1.800)	(-4.000)	(0.000)	(-.333)	(.400)	(1.750)	(-3.000)	(.750)	(-1.167)	(-1.400)	(-.200)
HD 6	-.006	.006	-.001	-.044	-.002	-.007	.009	.009	0.000	.016	-.026	.035	-.002
	(-.075)	(1.000)	(-.020)	(-6.276)	(-.400)	(-1.167)	(2.250)	(1.800)	(0.000)	(4.000)	(-3.714)	(1.458)	(-.400)
HD 7	-.010	.005	0.000	-.040	-.008	-.001	-.002	-.003	-.011	.009	-.024	-.002	.027
	(-1.250)	(1.000)	(0.000)	(-4.444)	(-1.143)	(-.143)	(-.400)	(-.600)	(-2.750)	(1.800)	(-4.000)	(-.333)	(1.930)
HD 8	-.005	.003	.012	-.058	-.007	-.008	-.016	-.003	-.012	-.001	-.019	-.009	.003
	(-.625)	(.600)	(2.400)	(-8.286)	(-1.167)	(-1.143)	(-3.200)	(-.500)	(-2.000)	(-.200)	(-2.714)	(-1.250)	(.430)
HD 9	-.019	-.004	.008	-.029	-.002	-.029	-.014	-.011	-.004	-.013	-.016	-.009	.003
	(-2.375)	(-.667)	(1.600)	(-3.625)	(-.286)	(-4.143)	(-2.800)	(-1.833)	(-.571)	(-2.167)	(-2.000)	(-1.500)	(.600)
HD10	-.037	-.027	-.015	-.034	-.025	-.051	-.036	-.029	-.011	-.029	-.022	-.023	-.016
	(-4.111)	(-4.500)	(-2.143)	(-3.400)	(-3.571)	(-5.667)	(-6.000)	(-4.143)	(-1.222)	(-3.625)	(-2.444)	(-1.769)	(-2.290)
ALL	.055	-.044	-.027	.118	.054	-.020	-.003	.001	.055	.016	.110	-.019	-.018
	(18.330)	(-22.000)	(-13.500)	(39.330)	(-27.000)	(-10.000)	(-1.500)	(.500)	(27.500)	(8.000)	(36.670)	(-6.333)	(-9.000)

t-values are in the parenthesis

Table III-16

Market Differential Returns for July Portfolio

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
HD 1	.047	.033	.004	.034	.020	.007	.004	.011	.051	.027	.017	.036	.049
	(3.615)	(3.667)	(.444)	(4.250)	(2.222)	(.875)	(.500)	(1.375)	(2.833)	(2.700)	(1.889)	(1.500)	(4.080)
HD 2	.005	.025	-.004	.014	.013	.007	-.015	.002	.001	.011	-.028	-.020	-.001
	(.625)	(3.125)	(-.571)	(2.800)	(1.857)	(1.167)	(-2.500)	(.333)	(.100)	(1.571)	(-4.667)	(-4.000)	(-.130)
HD 3	.021	.032	.004	.012	.002	.009	-.008	-.007	-.023	.003	.008	-.014	.003
	(2.625)	(4.000)	(.571)	(2.400)	(.286)	(1.800)	(-1.600)	(-1.400)	(-3.286)	(.429)	(.571)	(-3.500)	(.430)
HD 4	-.013	-.005	.012	.012	-.002	.001	.002	-.008	.039	0.000	-.010	-.008	.001
	(-2.167)	(-.714)	(1.714)	(2.400)	(-.333)	(.167)	(.500)	(-1.600)	(2.294)	(0.000)	(-1.667)	(-1.333)	(.170)
HD 5	-.002	-.003	.003	.005	.001	.009	.003	-.002	-.019	-.007	-.018	0.000	0.000
	(-.286)	(-.500)	(.600)	(.833)	(.167)	(1.800)	(.750)	(-.500)	(-2.714)	(-.875)	(-2.571)	(0.000)	(0.000)
HD 6	-.009	-.014	-.002	.004	-.005	.010	.010	-.005	-.024	-.003	.002	-.004	-.021
	(-1.286)	(-2.800)	(-.333)	(.667)	(-.833)	(2.500)	(1.667)	(-.833)	(-3.000)	(-.600)	(.286)	(-1.000)	(-2.330)
HD 7	-.010	-.010	.001	-.002	.003	-.001	.006	-.005	-.009	-.010	.006	.045	-.013
	(-.167)	(-1.667)	(.167)	(-.333)	(.500)	(-.167)	(1.500)	(-1.250)	(-1.000)	(-1.667)	(.857)	(5.000)	(-1.180)
HD 8	-.014	-.024	.002	-.021	-.004	-.002	.019	.004	-.021	-.006	-.001	.013	.005
	(-2.000)	(-4.800)	(.333)	(-3.500)	(-.667)	(-.400)	(3.800)	(.800)	(-3.000)	(-1.000)	(-.125)	(2.600)	(1.000)
HD 9	-.015	-.014	-.002	-.039	-.007	-.011	.001	.016	-.005	-.005	.009	-.017	.008
	(-2.143)	(-2.333)	(-.333)	(-6.500)	(-1.167)	(-2.200)	(.200)	(2.667)	(-.625)	(-.833)	(1.000)	(-3.400)	(1.140)
HD10	-.013	-.023	-.014	-.025	-.024	-.027	-.018	-.002	.011	-.012	.014	-.033	-.033
	(-1.444)	(-3.286)	(-2.000)	(-3.125)	(-3.429)	(-4.500)	(-3.000)	(-.250)	(.786)	(-1.200)	(1.400)	(-4.714)	(-3.670)
ALL	.058	.037	.011	-.043	-.088	-.052	-.022	-.012	.096	.078	.071	-.066	.063
	(19.330)	(18.500)	(5.500)	(-21.500)	(-44.000)	(-26.000)	(-11.000)	(-6.000)	(24.000)	(89.000)	(23.670)	(22.000)	(21.000)

t-values are in the parenthesis

Table III-17

Market Differential Returns for August Portfolio

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
HD 1	.081	.028	.019	.022	.044	.012	.006	.027	.043	.017	-.640	-.007	.019
	(5.400)	(3.500)	(2.714)	(2.000)	(4.400)	(1.500)	(.750)	(2.250)	(4.300)	(1.417)	(-4.019)	(-.700)	(1.360)
HD 2	.026	.018	-.003	.020	.015	-.006	.003	.007	.018	-.012	-.979	-.019	.012
	(2.600)	(2.571)	(-.500)	(2.222)	(2.143)	(-1.000)	(.429)	(1.167)	(3.600)	(-2.400)	(-1.494)	(-3.167)	(1.710)
HD 3	.009	.014	.003	.028	.011	-.002	.002	.001	.011	-.005	.207	-.009	.008
	(.900)	(2.000)	(.600)	(3.111)	(1.571)	(-.400)	(.333)	(.200)	(1.833)	(-.714)	(.338)	(-1.800)	(.800)
HD 4	-.022	.004	-.001	-.003	-.001	-.004	-.007	.002	.007	.005	-.410	-.006	.009
	(-2.200)	(.800)	(-.200)	(-.429)	(-.143)	(-.667)	(-1.167)	(-.500)	(1.750)	(1.250)	(-2.425)	(-1.000)	(.750)
HD 5	-.333	0.000	.002	.003	.003	-.002	-.005	-.006	-.001	0.000	.646	0.000	.017
	(-3.300)	(0.000)	(.500)	(.375)	(.500)	(-.400)	(-1.000)	(-1.500)	(-.200)	(0.000)	(.793)	(0.000)	(3.400)
HD 6	-.004	-.001	.006	-.005	-.018	.007	.002	-.012	-.001	-.002	.084	.001	.020
	(-.400)	(-.167)	(1.200)	(-.833)	(-3.000)	(1.400)	(.500)	(-3.000)	(-.200)	(-.500)	(.102)	(.200)	(4.000)
HD 7	-.032	.008	.001	-.019	-.010	.004	-.002	-.009	-.007	.005	.649	.017	0.000
	(-3.556)	(1.600)	(.250)	(-3.167)	(-1.429)	(1.000)	(-.286)	(-1.500)	(-1.167)	(.714)	(1.026)	(3.400)	(0.000)
HD 8	-.023	.003	.003	-.032	.002	.006	-.001	-.002	-.012	.014	-.033	.019	-.005
	(-2.556)	(.500)	(.750)	(-4.571)	(.333)	(1.000)	(-.250)	(-.400)	(-2.000)	(2.000)	(-2.135)	(3.167)	(-.830)
HD 9	.004	.020	-.007	-.010	-.003	-.004	.006	-.001	-.014	0.000	-.235	.028	-.026
	(.400)	(2.857)	(-1.750)	(-1.429)	(-.429)	(-1.000)	(1.500)	(-.167)	(-2.000)	(0.000)	(-.834)	(4.667)	(-4.330)
HD10	-.006	.011	-.020	-.008	-.039	-.006	-.008	.001	-.046	-.017	.074	-.025	-.052
	(-.545)	(1.222)	(-3.333)	(-.800)	(-4.875)	(-.857)	(-1.143)	(.125)	(-5.111)	(-1.889)	(1.590)	(-3.571)	(-6.500)
ALL	.105	-.105	-.028	.083	-.091	-.044	.014	.005	-.004	-.007	.044	-.091	.025
	(35.000)	(-7.500)	(-14.000)	(27.670)	(-45.500)	(-22.000)	(7.000)	(2.500)	(-2.000)	(-3.500)	(14.670)	(-45.500)	(8.330)

t-values are in the parenthesis

Table III-18

Market Differential Returns for September Portfolio

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
HD 1	.028	-.016	-.003	.056	.104	.001	.006	.015	-.056	-.016	.001	.128	.084
	(3.500)	(-2.000)	(-.375)	(3.500)	(6.993)	(.111)	(.600)	(1.875)	(-9.333)	(-1.778)	(.125)	(2.612)	(4.200)
HD 2	.035	-.009	.009	.016	.046	.015	.003	.007	-.021	-.012	.004	.027	.026
	(5.833)	(-1.500)	(1.286)	(2.286)	(3.538)	(1.875)	(.429)	(1.400)	(-3.500)	(-2.400)	(.500)	(3.000)	(2.890)
HD 3	.031	.004	-.004	.011	.022	-.013	.005	.002	.006	-.002	-.005	-.003	.015
	(5.167)	(.800)	(-.667)	(1.222)	(2.000)	(-1.857)	(1.000)	(.500)	(.857)	(-.400)	(-.714)	(-.429)	(1.500)
HD 4	.036	0.000	-.003	-.001	.013	-.001	-.001	.006	.020	.007	-.014	-.007	-.041
	(5.143)	(0.000)	(-.600)	(-.167)	(.867)	(-.143)	(-.250)	(1.500)	(3.333)	(1.400)	(-2.333)	(-1.167)	(-4.560)
HD 5	.029	.017	.007	.001	.004	.001	-.006	.003	.030	.002	.016	-.012	-.019
	(4.143)	(2.833)	(1.167)	(.143)	(.444)	(.167)	(-.857)	(1.000)	(5.000)	(.500)	(1.600)	(-2.000)	(-1.360)
HD 6	.013	.006	-.004	-.005	-.014	-.005	.004	.012	.031	.009	-.007	-.019	-.005
	(1.625)	(1.200)	(-.667)	(-.833)	(-1.556)	(-.714)	(1.000)	(.857)	(4.429)	(1.800)	(-1.167)	(-3.800)	(-.560)
HD 7	-.004	0.000	.005	-.011	-.036	.004	-.002	-.002	.044	.012	-.006	-.028	-.019
	(-.375)	(0.000)	(.833)	(-1.375)	(-3.600)	(.667)	(-.667)	(-.500)	(7.333)	(2.000)	(-1.000)	(-5.600)	(-3.170)
HD 8	-.016	0.000	.014	-.020	-.023	.010	0.000	-.009	.012	.011	-.015	-.043	-.015
	(-2.000)	(0.000)	(2.800)	(-2.857)	(-2.300)	(1.250)	(0.000)	(-2.250)	(1.714)	(2.200)	(-2.143)	(-7.167)	(-2.500)
HD 9	.138	.007	-.001	-.017	-.060	.003	-.008	-.006	-.009	.004	-.002	-.024	-.015
	(69.000)	(1.167)	(-.167)	(-2.125)	(-6.000)	(.500)	(-1.600)	(-1.000)	(-1.286)	(.800)	(-.286)	(-1.091)	(-1.880)
HD10	-.097	-.015	-.020	-.034	-.056	-.020	-.007	-.024	-.058	.020	.031	-.019	-.007
	(-9.700)	(-2.143)	(-2.857)	(-3.778)	(-5.091)	(-2.222)	(-.875)	(-3.000)	(-7.250)	(2.500)	(2.214)	(-2.375)	(-.441)
ALL	-.043	-.052	-.016	.003	.102	.023	-.024	-.033	-.195	-.108	.038	.074	.014
	(-14.330)	(-26.000)	(-8.000)	(1.000)	(25.500)	(11.500)	(-12.000)	(-16.500)	(-97.500)	(-54.000)	(12.670)	(12.330)	(34.000)

t-values are in the parenthesis

Table III-19

Market Differential Returns for October Portfolio

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
HD 1	-.041	.016	.020	-.030	.001	.004	.026	.041	.095	.035	.010	.005	.047
	(-5.857)	(1.778)	(2.500)	(-3.333)	(.100)	(.308)	(2.600)	(4.100)	(11.875)	(3.500)	(.769)	(.147)	(2.760)
HD 2	-.017	-.002	.012	-.019	.012	-.015	.010	.023	.058	.015	-.032	.008	-.004
	(-2.429)	(-.286)	(1.500)	(-2.375)	(1.500)	(-1.875)	(1.667)	(3.286)	(7.250)	(1.875)	(-4.571)	(1.333)	(-.670)
HD 3	-.003	.001	.012	.003	.006	-.012	-.003	.002	.038	.018	-.023	.016	.004
	(-.429)	(.167)	(1.714)	(.429)	(.750)	(-1.714)	(-.500)	(.333)	(4.750)	(2.250)	(-3.286)	(3.200)	(.440)
HD 4	.008	-.007	.001	.004	.005	-.008	.005	.002	.018	.003	-.023	0.000	.008
	(1.143)	(-1.167)	(.143)	(.571)	(.833)	(-1.333)	(.833)	(.400)	(2.571)	(.500)	(-3.286)	(0.000)	(.750)
HD 5	.010	.002	-.001	.013	-.005	-.070	.001	-.010	.003	-.002	-.004	.025	-.001
	(1.167)	(.400)	(-.167)	(1.857)	(-.833)	(-.875)	(.200)	(-.667)	(.500)	(-.333)	(-.286)	(5.000)	(-.200)
HD 6	.009	.001	-.010	.016	.001	.004	-.003	-.020	-.029	-.009	-.025	.002	-.007
	(1.500)	(.200)	(-1.660)	(2.000)	(.143)	(.667)	(-.750)	(-5.000)	(-5.800)	(-1.500)	(-4.167)	(.400)	(-1.170)
HD 7	.020	.003	-.008	.014	-.004	.011	.001	-.014	-.037	-.009	.006	.004	-.001
	(3.333)	(.600)	(-1.600)	(2.000)	(-.571)	(1.833)	(.125)	(-2.333)	(-7.400)	(-1.500)	(.667)	(.667)	(-.100)
HD 8	.018	.004	0.000	0.000	-.005	.006	-.008	-.017	-.043	-.011	.010	-.005	-.015
	(2.571)	(.800)	(0.000)	(0.000)	(-.625)	(.857)	(-1.600)	(-2.429)	(-10.750)	(-1.833)	(1.111)	(-.833)	(-2.140)
HD 9	.011	.006	0.000	.013	.004	.010	-.005	0.000	-.045	-.021	.027	-.018	-.010
	(1.571)	(1.200)	(0.000)	(1.625)	(.500)	(1.670)	(-1.000)	(0.000)	(-11.250)	(-3.000)	(3.000)	(-3.000)	(-1.110)
HD10	-.014	-.022	-.031	-.011	-.012	.006	-.025	-.008	-.061	-.015	.053	-.034	-.019
	(-1.556)	(-3.143)	(-5.167)	(-1.222)	(-1.333)	(.667)	(-3.125)	(-.889)	(-10.167)	(-1.875)	(4.417)	(-3.778)	(-1.900)
ALL	.004	-.030	.042	-.184	-.057	.022	.025	.073	.042	.066	.066	.015	.025
	(2.000)	(-15.000)	(21.000)	(-92.000)	(-28.500)	(11.000)	(12.500)	(36.500)	(21.000)	(33.000)	(22.000)	(7.500)	(8.330)

t-values are in the parenthesis

Table III-20

Market Differential Returns for November Portfolio

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
HD 1	.018	.057	.023	.020	.015	.050	.085	.018	.017	.038	.020	.059	.055
	(1.500)	(4.750)	(2.875)	(1.818)	(1.364)	(4.167)	(6.071)	(2.250)	(1.889)	(2.714)	(1.818)	(2.185)	(2.500)
HD 2	-.006	.034	.011	-.002	-.001	.014	.024	.001	.006	.001	.010	-.022	-.026
	(-.667)	(3.778)	(1.571)	(-.222)	(-.111)	(2.333)	(3.429)	(.250)	(1.200)	(.143)	(1.667)	(-3.667)	(-2.360)
HD 3	-.002	.015	.010	-.020	-.002	.005	.017	.014	.006	-.001	.010	-.016	-.010
	(-.222)	(1.667)	(1.667)	(-1.500)	(-.286)	(1.000)	(2.429)	(2.000)	(1.200)	(-.125)	(2.000)	(-3.200)	(-1.000)
HD 4	.017	.004	.007	.004	-.016	0.000	-.018	-.006	-.019	-.027	.008	-.009	-.021
	(2.429)	(.500)	(1.400)	(.500)	(-2.000)	(0.000)	(-2.250)	(-1.200)	(-3.167)	(-3.857)	(1.333)	(-1.500)	(-3.000)
HD 5	.008	-.014	.002	-.017	.003	.001	-.002	-.003	-.001	-.014	.015	.099	-.004
	(1.000)	(-2.000)	(.400)	(-2.125)	(.429)	(.125)	(-.250)	(-.600)	(-.250)	(-.200)	(2.500)	(.925)	(-.500)
HD 6	.011	-.007	.011	-.008	.005	-.003	-.025	.001	.004	-.014	-.001	-.006	-.001
	(1.571)	(-1.000)	(1.571)	(-1.143)	(.833)	(-.750)	(-5.000)	(.200)	(.800)	(-2.000)	(-.200)	(-1.500)	(-.125)
HD 7	.002	-.019	-.004	-.005	.005	-.006	-.002	-.008	0.000	-.015	-.002	-.015	-.002
	(.286)	(-2.714)	(-.800)	(-.625)	(.714)	(-1.000)	(-.333)	(-2.000)	(0.000)	(-2.500)	(-.400)	(-3.750)	(-.250)
HD 8	-.005	-.033	-.008	.006	-.011	-.014	-.025	-.013	.003	-.005	-.002	-.019	0.000
	(-.714)	(-5.500)	(-1.333)	(.857)	(-1.375)	(-2.333)	(-4.167)	(-2.600)	(.500)	(-.625)	(-.286)	(-3.800)	(0.000)
HD 9	-.009	-.022	-.020	.004	.017	-.018	-.027	0.000	0.000	.007	-.020	-.023	-.003
	(-1.286)	(-3.143)	(-3.333)	(.571)	(2.429)	(-3.600)	(-4.500)	(0.000)	(0.000)	(.875)	(-3.333)	(-3.833)	(-.270)
HD10	-.030	-.011	-.032	.010	-.010	-.034	-.022	0.000	-.020	.028	-.040	-.052	.009
	(-5.000)	(-1.000)	(-4.571)	(1.111)	(-1.000)	(-4.250)	(-2.200)	(0.000)	(-2.857)	(2.800)	(-5.000)	(-6.500)	(.690)
ALL	.079	.115	-.010	-.037	-.082	-.008	.099	.014	.007	.066	-.040	-.006	.088
	(26.330)	(38.330)	(-5.000)	(-12.330)	(-27.330)	(-4.000)	(33.000)	(7.000)	(3.500)	(22.000)	(-20.000)	(-.055)	(22.000)

t-values are in the parenthesis

Table III-21

Market Differential Returns for December Portfolio

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
HD 1	.131	.098	.009	.446	.371	.098	.053	.056	.084	.117	.405	.056	.162
	(6.550)	(3.630)	(1.000)	(1.522)	(7.894)	(6.533)	(3.313)	(7.000)	(5.250)	(1.410)	(1.893)	(3.290)	(6.000)
HD 2	.031	.021	.007	.081	.095	.042	.028	-.003	.055	-.098	-.016	-.005	.001
	(2.818)	(1.400)	(1.000)	(5.063)	(5.938)	(2.211)	(2.800)	(-.500)	(3.929)	(-5.444)	(-.271)	(-.830)	(.110)
HD 3	.052	-.027	.001	.002	.029	.003	-.014	-.005	.013	-.140	-.063	-.005	-.014
	(.825)	(-3.000)	(.143)	(.167)	(1.933)	(.300)	(-1.750)	(-1.000)	(1.650)	(-20.000)	(-4.200)	(-1.000)	(-1.750)
HD 4	-.023	-.018	.005	-.017	.008	-.011	.002	-.011	-.010	.553	-.082	-.001	-.036
	(-2.556)	(-2.250)	(.714)	(-1.214)	(.471)	(-1.100)	(.250)	(-2.750)	(-2.000)	(1.881)	(-11.714)	(-.250)	(-6.000)
HD 5	-.028	-.024	-.005	-.046	-.004	-.030	-.005	.018	-.011	-.137	-.092	-.008	.015
	(-3.500)	(-2.667)	(-.833)	(-3.833)	(-.250)	(-3.750)	(-.833)	(1.800)	(-1.000)	(-17.125)	(-11.500)	(-1.600)	(.880)
HD 6	-.033	-.019	.017	-.084	-.063	.025	-.016	-.016	.031	-.112	-.083	-.010	.004
	(-4.125)	(-2.111)	(2.419)	(-12.000)	(-5.250)	(.556)	(-2.286)	(-1.778)	(1.107)	(-11.200)	(-5.533)	(-1.670)	(.190)
HD 7	-.029	-.038	-.004	-.047	-.110	-.041	-.010	-.025	-.042	-.094	.232	.026	-.059
	(-2.900)	(-4.750)	(-.667)	(-3.357)	(-11.000)	(-4.556)	(-1.667)	(-6.250)	(-8.500)	(-8.545)	(1.886)	(1.860)	(-9.830)
HD 8	-.048	-.006	-.007	-.096	-.073	-.049	-.010	-.024	-.029	-.101	-.095	-.012	-.037
	(-6.000)	(-.600)	(-1.167)	(-16.000)	(-4.563)	(-4.900)	(-.833)	(-4.800)	(-3.625)	(-7.214)	(-11.875)	(-2.400)	(-4.630)
HD 9	-.035	.001	-.006	-.124	-.138	-.042	-.009	-.021	-.041	-.089	-.114	-.018	-.039
	(-3.889)	(.100)	(-1.000)	(-11.273)	(-13.800)	(-4.667)	(-1.000)	(-3.500)	(-6.833)	(-8.091)	(-12.667)	(-3.000)	(-4.330)
HD10	-.017	.007	-.014	-.116	-.120	.006	-.015	.029	-.045	.098	-.089	-.026	.002
	(-1.545)	(.538)	(-1.556)	(-8.923)	(-6.667)	(.261)	(-1.364)	(.604)	(-5.625)	(1.101)	(-3.870)	(-2.890)	(.120)
ALL	.140	.099	-.038	.168	.314	.210	.028	-.020	.100	.204	.091	-.016	.113
	(20.000)	(24.750)	(-19.000)	(5.600)	(44.860)	(35.000)	(9.330)	(-4.000)	(25.000)	(6.375)	(3.500)	(-5.330)	(22.600)

t-values are in the parenthesis

This result also seems to suggest that tax-loss selling is the sole contributor to the high January return.

Table III-21 shows the January performances of the December portfolios for 13 years. In January, Portfolio HD1 had market differential returns ranging 0.9 % in 1973 to 44.6 % in 1974. Thus this portfolio seems to have widely fluctuating market differential returns over time. While January always has positive market differential returns, 44.6 % in 1974, 40.5 % in 1981 and 37.1 % in 1975 are particularly large January differential returns.

Table III-10 through Table III-21 also show that as we move toward the middle portfolios, the returns are closer to the market return. Portfolio HD1 seems to have more chances of beating the market than the other portfolios and the probability of beating the market decreases as we move from Portfolio HD1 to Portfolio HD10. The middle portfolios, Portfolio HD5 and HD6, seem to maintain their returns at the market level even in the following month.

While these preliminary results seem to support the tax-loss selling hypothesis, several questions can still be raised.

First, is Portfolio HD1 the only contributor to the abnormal January return? If so, do they persist over time?

Second, do we obtain similar results after risk-adjustment?

Third, are the risk-adjusted abnormal returns large enough to cover the transaction and search costs?

Fourth, does the composition of each portfolio differ? That is, are the stocks in Portfolio HD1 of relatively smaller firms than those stocks in other portfolios? Are the stocks in Portfolio HD1 usually low priced - less than 2 dollars a share?

Fifth, does the fact that Portfolio HD1 consistently outperforms the market support Constantinides' (1984) contention that tax-loss selling occurs throughout the year?

Sixth, can the poor performance of the Portfolio HD10 be interpreted as the result of investors' realizing long-term capital gains?

Seventh, do portfolios tend to maintain their returns at the market level over time, regardless of their risk levels?

Eighth, does the instability of the market differential returns of Portfolio HD1 in January suggest the influence of the market conditions on the specific year to the returns?

The questions are explored further in the following chapter.

Chapter Summary

On an unadjusted basis, the losers of one month seem to outperform the market in the following month. The biggest losers (lowest returns decile) of one month tend to have the highest market differential returns in the following month throughout the 13 years studied. The market differential returns of the Portfolio HD1 (the lowest decile) in January is especially large. While the size of the market differential return of Portfolio HD1 varies greatly over time, it still may be the primary contributor to the high overall January returns. Thus, this preliminary study supports the tax-loss selling hypothesis without bringing in the size effect.

C H A P T E R IV

EMPIRICAL IMPLICATIONS

Many studies have already shown that past price (return) changes and the future price (return) changes are very nearly uncorrelated. (Fama (1965, 1970), Granger and Morgenstern (1970), Cootner (1974), Fama and MacBeth (1973) and Jennegren (1975)) In the results reported in previous chapter, however, I showed that the losers one month (Portfolio HD1) consistently outperform the market on an unadjusted basis while the winners of one month (Portfolio HD10) are consistently outperformed by the market in the following month.

This chapter further pursues the issues raised in the previous chapter. Since the different composition of the portfolios might have different impacts on the portfolio returns, this chapter first studies the composition of the portfolios --- submarket composition and the price composition. The impact of risk-adjustment on the Jnauary effect and the return association of the stocks in each submarket are also provided in this chapter.

Composition of the Portfilio

If the market is weak-form efficient, stocks belonging to Portfolio HD1 at t are unlikely to be in the same portfolio at t+1. Each potfolio is equally likely to have the stock in its composition at t+1. That is, the performance of the Portfolio HD1 should not have been disproportionately influenced by having the same stocks belonging to it over time.

Table IV-1 shows the total number of stocks in the sample and the percentage of stocks that belong to specific submarkets. The number of stocks in the sample does not change within a given year. Thus, assuming a random distribution of the stocks in each market, the composition of the portfolios at each month of the year should be similar to those shown in Table IV-1. For example, in each month of 1970, each portfolio should have about 60% of NYSE stocks, 24% of AMEX stocks and 16% of OTC stocks.

Table IV - 1

Composition of Stocks in the Sample

Year	Total	NYSE (%)	AMEX (%)	OTC (%)
1970	2008	60.06	24.25	15.69
1971	2260	56.32	22.88	20.80
1972	2508	52.59	22.89	24.52
1973	2756	49.13	22.93	27.94
1974	2838	48.31	22.55	29.14
1975	2859	48.09	22.63	29.28
1976	2928	46.34	22.27	31.39
1977	2990	47.06	22.34	30.60
1978	3216	43.88	21.42	34.70
1979	3739	38.01	18.96	43.03
1980	3888	36.71	18.49	44.80
1981	4607	31.08	15.96	52.96
1982	4800	29.63	15.52	54.85

Table IV-2 reports the composition of Portfolio HD1 from February 1970 to December 1982. Clearly Portfolio HD1 contains more AMEX and OTC stocks and less NYSE stocks than a random distribution would lead us to expect --- implying that Portfolio HD1 has a disproportionate number of small firm stocks. The table does not, however, show any systematic differences in the composition of portfolios among the months. The December portfolio does not have

Table IV-2

Market Composition of Portfolio HD 1

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG.
1970	NYSE	0.0	39.8	41.8	37.8	46.3	55.7	33.8	45.3	56.7	40.3	25.9	35.4	41.7
	AMEX	0.0	41.3	42.3	45.8	32.8	34.3	47.8	39.8	20.9	48.3	57.8	45.3	41.4
	OTC	0.0	18.9	15.9	15.4	20.9	10.0	18.4	14.9	22.4	11.4	16.9	19.3	16.9
1971	NYSE	69.2	48.2	33.6	44.7	31.4	34.5	42.9	38.5	38.5	44.7	33.6	37.6	41.5
	AMEX	18.4	24.3	38.9	38.5	45.1	42.9	41.2	39.8	37.6	32.7	38.9	34.1	39.0
	OTC	12.4	27.5	27.5	16.8	23.5	22.6	15.9	21.7	23.9	22.6	27.5	28.3	22.5
1972	NYSE	57.1	46.2	36.7	34.3	34.7	37.9	38.6	32.7	33.5	31.1	27.1	37.9	37.3
	AMEX	16.3	31.5	39.8	36.7	40.2	31.1	36.7	39.8	37.1	36.3	36.3	35.5	34.8
	OTC	26.6	22.3	23.5	29.0	25.1	31.0	24.7	27.5	29.4	35.6	36.6	26.6	27.9
1973	NYSE	49.8	27.2	36.6	37.0	27.2	31.2	42.8	27.9	22.5	43.8	35.1	23.9	33.8
	AMEX	24.7	33.4	30.8	31.2	40.2	32.2	25.0	39.5	41.7	23.9	25.0	41.7	32.4
	OTC	25.5	37.4	32.6	31.8	32.6	36.6	32.2	42.6	35.8	32.4	39.9	34.4	33.8
1974	NYSE	55.4	33.1	46.8	39.1	33.4	43.0	38.4	39.8	39.2	29.6	26.4	20.9	37.1
	AMEX	13.8	31.3	23.2	26.4	31.0	25.7	22.9	21.1	26.8	33.8	34.2	37.0	27.3
	OTC	30.8	35.6	30.0	34.5	35.6	31.3	38.7	39.1	34.1	36.6	39.4	42.1	35.6
1975	NYSE	41.6	33.9	28.3	36.0	32.2	29.0	42.3	21.3	32.5	28.6	23.1	23.7	31.0
	AMEX	20.4	30.0	31.8	32.9	32.5	31.5	21.3	39.5	30.1	31.1	38.1	39.2	31.5
	OTC	38.0	36.1	39.9	31.1	35.3	39.5	35.4	39.2	37.4	40.3	38.8	37.1	37.5
1976	NYSE	29.0	53.2	25.6	32.4	26.3	19.1	32.4	25.9	24.5	28.3	25.3	24.6	28.9
	AMEX	22.7	14.7	34.1	36.5	34.5	39.2	29.7	33.8	30.4	33.1	38.9	28.3	31.3
	OTC	48.3	32.1	40.3	31.1	39.2	41.7	37.9	40.3	45.1	38.6	35.8	47.1	39.8
1977	NYSE	51.4	34.7	28.1	27.4	30.5	23.7	39.4	31.1	31.8	26.7	22.1	28.1	31.3
	AMEX	13.3	30.4	32.8	28.8	29.8	28.8	29.4	33.4	30.1	29.1	33.1	33.4	29.4
	OTC	35.3	34.9	39.1	43.8	39.7	47.5	31.2	35.5	38.1	44.2	44.8	38.5	39.3
1978	NYSE	41.7	39.4	27.6	25.8	28.6	29.8	22.7	32.0	26.1	23.6	16.8	20.2	27.9
	AMEX	19.1	22.7	23.3	25.3	25.5	29.5	28.9	20.8	27.3	33.8	24.5	39.8	27.3
	OTC	39.2	37.9	49.1	46.9	45.9	40.7	48.4	47.2	46.6	37.6	58.7	40.0	44.8
1979	NYSE	32.7	18.2	17.9	21.1	15.5	19.0	13.1	15.5	17.6	17.9	15.5	22.7	18.9
	AMEX	25.2	19.5	21.1	21.7	23.0	22.5	26.7	17.9	21.4	15.0	22.2	20.9	21.4
	OTC	42.1	62.3	61.0	57.2	61.5	58.5	60.2	66.6	61.0	67.1	62.3	56.4	59.7
1980	NYSE	37.9	21.6	13.8	17.3	13.9	22.2	26.0	31.7	23.2	26.3	21.9	15.9	22.6
	AMEX	13.1	23.4	21.6	16.7	19.5	20.6	20.6	14.1	19.3	13.5	26.5	17.7	19.3
	OTC	49.0	55.0	64.6	66.0	66.6	57.2	53.4	54.2	57.5	55.2	51.6	66.4	58.1
1981	NYSE	31.2	10.0	14.5	15.0	13.0	14.3	13.2	11.5	9.1	20.6	7.8	9.1	14.1
	AMEX	17.0	13.4	15.2	13.9	13.9	12.6	15.4	15.6	25.2	14.3	12.8	15.6	13.3
	OTC	51.8	76.6	70.3	71.1	73.1	73.1	71.4	72.9	75.7	65.1	79.4	75.3	72.6
1982	NYSE	16.6	10.6	11.9	10.8	13.9	10.0	15.2	6.9	11.2	12.3	9.2	12.1	12.1
	AMEX	15.1	13.3	12.1	14.0	14.4	14.8	13.7	16.0	17.9	11.0	13.7	14.4	14.2
	OTC	68.3	76.1	76.0	75.2	66.7	75.2	71.1	77.1	70.9	76.7	77.1	73.5	73.7
AVG.	NYSE	42.8	32.0	27.9	28.1	27.1	28.4	30.8	27.7	28.2	28.8	22.3	24.0	29.1
	AMEX	18.3	25.3	28.2	28.5	29.4	28.1	27.6	28.5	27.4	28.1	30.8	31.0	27.7
	OTC	38.9	42.7	43.9	42.4	43.5	43.5	41.6	43.8	44.2	43.1	46.8	45.0	43.2

more small firm stocks than the other months. Thus, any small firm effect might well take place throughout the year --- not just in January. The positive market differential return of Portfolio HD1 throughout the year might have been caused by the small firm stocks, but the outstanding January return of Portfolio HD1 cannot be explained by the small firm stocks only. The year-end effect may, however, have its greatest impact on the small firm stocks of December.

To check Roll's (1983) conjecture that low-priced stocks might be the cause of the abnomal January returns, the following tests were performed. First, percentage of the low-priced stocks in Portfolio HD1 was studied and the returns of these stocks in the following month were computed. Table IV-3 reports the percentage of stocks whose prices are less than 2 dollars and 3 dollars.

Clearly, as the percentage of the OTC stocks increases over time, the percentage of the low-priced stocks also increases. In a given year, however, no month consistently has a larger percentage of the low-piced stocks than any other month. Sometimes the December portfolio has more low-priced stocks and sometimes not.

Table IV-3

Price Composition of Portfolio HD 1

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG.
1970	$2	0.0	6.0	5.5	5.0	4.5	4.5	8.0	5.0	3.5	4.5	9.5	8.0	5.8
	$3	0.0	15.4	10.4	14.4	9.0	11.9	17.4	12.4	7.0	17.9	20.4	23.4	14.5
1971	$2	2.5	2.2	6.5	5.3	4.9	7.1	5.3	8.0	7.5	2.7	5.3	7.1	5.4
	$3	7.0	6.6	15.9	10.2	16.8	17.3	14.2	19.0	19.0	10.6	14.6	16.4	14.0
1972	$2	.9	4.8	5.6	5.2	5.6	2.4	3.6	4.0	5.2	4.4	6.8	4.4	4.5
	$3	3.1	10.0	17.1	13.9	14.7	8.4	8.4	11.2	10.8	12.4	17.9	15.9	12.0
1973	$2	.8	16.3	22.8	17.8	23.9	19.9	15.6	19.9	25.7	15.6	18.8	31.5	19.1
	$3	2.8	34.1	34.4	31.9	45.7	36.2	27.2	42.4	50.7	30.1	37.0	53.6	35.5
1974	$2	7.2	39.4	28.9	31.3	35.9	31.0	31.0	31.7	27.1	42.6	41.9	57.0	33.8
	$3	13.0	63.0	45.4	47.9	59.9	46.5	44.4	49.3	45.8	60.2	59.5	75.4	50.9
1975	$2	17.6	23.4	17.5	25.2	17.8	19.2	16.8	22.4	24.1	15.9	24.5	28.3	21.9
	$3	29.2	39.5	31.1	47.9	35.3	37.4	31.8	46.2	45.8	47.2	49.3	48.6	40.8
1976	$2	11.9	5.1	16.0	16.4	15.4	16.7	14.3	14.7	20.5	14.7	16.7	10.9	14.4
	$3	25.5	11.3	35.8	35.8	31.1	38.6	28.0	32.1	37.9	30.0	31.7	24.9	30.2
1977	$2	6.1	11.7	12.4	11.7	10.7	16.7	12.0	15.1	10.4	14.0	12.0	14.4	12.3
	$3	13.7	26.1	27.1	26.1	23.1	45.2	24.7	28.1	24.1	27.4	27.1	28.8	26.8
1978	$2	6.7	8.7	8.4	8.4	12.7	9.3	11.8	5.9	8.1	6.8	14.6	11.2	9.4
	$3	12.4	19.6	20.2	22.7	26.1	20.5	26.7	20.2	18.3	20.5	34.8	30.1	22.7
1979	$2	4.7	14.7	15.8	15.5	19.5	13.9	15.2	18.2	17.9	15.5	20.1	13.2	15.4
	$3	11.8	29.7	30.2	32.1	31.6	27.3	31.6	29.9	32.4	28.6	36.4	28.5	29.2
1980	$2	6.7	7.2	14.7	15.4	14.1	11.6	8.2	11.3	11.2	13.1	14.1	14.9	11.9
	$3	15.8	15.9	27.0	18.0	24.9	21.3	17.2	22.1	19.8	23.0	28.5	25.4	22.4
1981	$2	6.7	34.3	33.0	37.3	35.4	26.0	33.2	30.6	31.7	32.3	44.5	20.7	30.5
	$3	11.1	46.0	42.7	46.4	46.2	37.5	43.0	40.6	46.0	40.6	56.6	34.7	41.0
1982	$2	32.2	45.6	35.2	42.7	31.0	40.4	39.4	32.5	41.7	32.9	44.0	38.7	38.0
	$3	40.4	54.4	49.2	54.0	41.3	51.5	49.2	48.3	56.5	46.2	54.8	47.9	49.5
AVG.	$2	8.7	16.9	17.1	18.3	17.8	16.8	16.5	16.9	18.0	17.3	21.0	20.0	17.1
	$3	15.5	28.6	29.7	31.6	31.2	31.2	28.0	30.9	31.9	30.4	36.0	34.9	30.0

While the percentage of low-priced stocks in HD1 is rather high in the late 1970's and in the early 1980's, few significantly large return differentials were found in those years in the preliminary study.

Stocks in Portfolio HD1 were subdivided into differential price levels at month t and the returns at month t+1 were computed. Table IV-4 shows the aggregated results and Table IV-5 shows the year-by-year January returns of the December portfolio.

Table IV-4 clearly shows that low-priced stocks outperform the high-priced stocks throughout the twelve months. The performance of the low-priced stocks in January is remarkable. In Table IV-3, however, the proportion of the low-priced stock (less than 2 dollars or 3 dollars) were almost the same throughout the months in a given year. The outstanding performance of the low-priced stocks in January leads us to believe that low-pricednes of stocks are not the only cause of the abnormal January return. The year-end effect may have its greatest impact on the low-piced stocks of December.

Table IV - 4

Return Comparision of the Low-Priced Stocks in HDl

	$2<	$2>	$3<	$3>	$5<	$5>
JAN	.443	.104	.381	.085	.319	.055
	(9.844)	(26.000)	(11.206)	(21.250)	(12.760)	(11.000)
FEB	.080	.010	.070	.007	.060	.000
	(4.706)	(3.333)	(5.833)	(2.333)	(6.667)	(0.000)
MAR	.109	.026	.087	.023	.074	.015
	(9.909)	(8.667)	(10.875)	(7.667)	(12.333)	(3.750)
APR	.082	.011	.064	.008	.052	.001
	(7.455)	(3.667)	(8.000)	(2.667)	(8.667)	(.250)
MAY	.059	-.002	.052	-.008	.037	-.013
	(5.900)	(-.667)	(6.500)	(-2.667)	(6.167)	(-4.333)
JUN	.056	.014	.049	.009	.042	.002
	(5.091)	(4.667)	(6.125)	(3.000)	(7.000)	(.667)
JUL	.065	.032	.061	.028	.054	.023
	(7.222)	(10.667)	(8.714)	(9.333)	(10.800)	(5.750)
AUG	.092	.022	.079	.018	.061	.015
	(5.750)	(7.333)	(6.583)	(6.000)	(7.625)	(5.000)
SEP	.043	.010	.038	.006	.033	.000
	(3.583)	(3.333)	(4.750)	(2.000)	(5.500)	(.000)
OCT	.094	.001	.075	-.006	.057	-.014
	(7.833)	(.250)	(8.333)	(-1.500)	(8.143)	(-2.800)
NOV	.074	.037	.059	.039	.054	.037
	(5.286)	(9.250)	(5.900)	(9.750)	(7.714)	(9.250)
DEC	.086	.029	.070	.029	.058	.030
	(6.143)	(9.667)	(7.000)	(7.250)	(7.250)	(7.250)

t-values are in the parenthesis

Table IV - 5

January Return of the December Low-Priced Stocks in HDl

	$2<	$2>	$3<	$3>	$5<	$5>
1971	.427	.237	.399	.205	.363	.164
	(5.693)	(11.850)	(7.528)	(13.667)	(9.811)	(11.714)
1972	.533	.136	.441	.123	.333	.105
	(2.913)	(9.714)	(3.645)	(8.786)	(4.690)	(6.176)
1973	.035	-.044	.043	-.057	.027	-.071
	(1.296)	(-4.889)	(2.048)	(-6.333)	(1.688)	(-7.888)
1974	.412	.229	.387	.186	.354	.132
	(11.444)	(10.409)	(13.345)	(7.750)	(14.750)	(4.714)
1975	.825	.455	.775	.411	.731	.374
	(10.443)	(11.667)	(11.397)	(11.108)	(12.183)	(8.905)
1976	.398	.240	.383	.217	.358	.168
	(13.724)	(13.333)	(15.320)	(12.056)	(17.900)	(8.400)
1977	.290	.038	.238	.020	.179	-.016
	(4.085)	(3.455)	(5.064)	(1.667)	(5.967)	(-1.333)
1978	.080	.020	.075	.011	.060	.001
	(3.478)	(2.222)	(4.412)	(1.222)	(4.615)	(.001)
1979	.244	.152	.220	.151	.201	.135
	(4.136)	(13.818)	(5.000)	(13.727)	(7.731)	(11.250)
1980	.791	.131	.621	.111	.481	.084
	(2.138)	(8.188)	(2.426)	(7.400)	(2.764)	(4.667)
1981	1.121	.003	.742	-.002	.519	-.016
	(1.791)	(.333)	(1.814)	(-.200)	(1.874)	(-1.600)
1982	.088	-.013	.066	-.010	.056	-.024
	(2.514)	(-1.182)	(2.276)	(-.833)	(2.333)	(-1.846)
1983	.446	.151	.406	.144	.365	.128
	(6.862)	(12.583)	(7.382)	(13.091)	(8.111)	(10.667)

t-values are in the parenthesis

Table IV-5 shows the year-by-year January return comparision for December portfolio for various price levels. While low-priced stocks may outperform the high-priced stocks, the January returns vary substantially over time. For stocks priced less than 2 dollars, average returns ranged from 3.5 % in 1973 to 112.1 % in 1981. While low-priced stocks do generally perform better than the high-priced stocks throughout the year, no fully satisfactory explanaton could be given why they perform especially well in January. Either these stocks have strong association with the tax-loss selling candidates (confounding effect) or the abnormal January returns may be result from other sources.

Summary of the Composition Study

Throughout the year, Portfolio HD1 is composed of more small firm stocks and low-priced stocks than a random distribution leads us to expect. If these stocks are to perform better than the large firm stocks and high-priced stocks just because they are small and low-priced, their superior performances should be observed throughout the year. Since these stocks have particularly large returns only in January, it might be said that the year-end effect has its greatest impact on these stocks. The small firm

stocks and low-priced stocks may have some confounding effect with the tax-loss selling pressures which would lead to abnormal January returns.

Risk-Adjusted Abnormal Returns

Clearly some investors can have higher gross rates of return than others even in an efficient market. For a weak and semi-strong efficient market, however, the equilibrium net rates of return should be the same for all investors after adjusting the returns for the risks born and the cost of information utilized by the investors. While nobody disputes the important role of luck, diversification across large numbers of securities should minimize its impact.

Accordingly this section explores the impact of risk-adjustment on the January effect. Risk-adjusted monthly abnormal returns for the ten portfolios were obtained as follow. Since the systematic risk (beta) of each stock in the sample must be seperately estimated, only 1,803 stocks that have the complete monthly data of prices and dividends over the 13 years were selected for study. This tended to restrict the samples to larger more established firms, particularly NYSE issues. When the market composition of these 1,803 stocks were studied, 1,142 stocks (63.3%) were NYSE traded, 408 stocks (22.6%)

and 243 stocks (14.1%) were AMEX and OTC traded respectively.

The 60 month moving average beta was estimated by $\hat{\beta}_{i,t} = \text{Cov}(R_{i,t}\ R_{m,t}) / \text{Var}(R_{m,t})$ for each individual stock. The estimated beta was, then, adjusted by $\hat{\beta}_{i,2} = 0.343 + 0.677\ \hat{\beta}_{i,1}$ as Blume (1975) suggested. The abnormal returns were calculated as follows using the Blume adjusted betas:

$$\alpha_{i,t} = (R_{i,t} - Rf,t) - \hat{\beta}_i (R_{m,t} - Rf,t)$$

where $\alpha_{i,t}$; abnormal return for stock i at month t
$R_{i,t}$; return of a stock i at t
$R_{f,t}$; return of a risk-free asset at t; measured as the realized monthly return on the 30-day Treasury bills
$R_{m,t}$; return on the market portfolio at t; measured by the equally weighted index of all stocks in the PDE tape

Thus , the first 60 months from February 1970 to January 1975 were used to estimate the first beta of a stock and the estimated beta was adjusted to compute the risk-adjusted abnormal return of the stock in February 1975. The second beta was estimated and adjusted using the data from March 1970 to February 1975 and so on.

The betas and abnormal returns of the portfolios were computed as the cross-sectional arithmetic average of the individual stock's beta and abnormal returns. That is, $\hat{\beta}_{p,t} = 1/n \sum_{i}^{n} \hat{\beta}_{i,t}$ and $\alpha_{p,t} = 1/n \sum_{i}^{n} \alpha_{i,t}$. Thus, the abnormal return was determined in the context of the two-parameter capital asset pricing model.

Table IV-6 shows the abnormal returns to the ten portfolios along with their estimated and adjusted systematic risks. Portfolio HD1 and HD10 have higher systematic risks (betas) than the other portfolios --- supporting the previous results that both portfolios contain more small firm stocks which can be considered more volatile (risky). Even after risk-adjustment, Portfolio HD1 has positive abnormal returns in all months except February, while Portfolio HD10 has negative abnormal returns in all months except June and February.

The positive abnormal returns to Portfolio HD1 ranged from 1.3% in August to 5.3% in June. For Portfolio HD10, the negative abnormal returns ranged from -0.1% in November to -4.5% in January. In January, the positive abnormal return has been achieved only by Portfolio HD1 --- the biggest losers of December. But considering the magnitude of the differential returns before risk-adjustment, risk seems to explain a large portion of the returns to Portfolio HD1. And with a few exceptions, the magnitude of the abnormal returns get smaller as we move from HD1 to HD10 --- the same pattern found in the preliminary study.

Table IV-6

Abnormal Returns to the Portfolios

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
HD 1	BETA	1.094	.900	1.040	1.033	1.051	1.068	1.070	1.042	1.067	1.141	1.094	1.008
	ABRT	.023	-.005	.045	.015	.019	.053	.020	.013	.025	.021	.037	.023
		(3.833)	(-1.667)	(9.000)	(3.000)	(4.750)	(8.833)	(5.000)	(3.250)	(5.000)	(3.500)	(7.400)	(4.600)
HD 2	BETA	.969	.864	.962	.918	.945	.951	.992	.940	.951	.995	.996	.917
	ABRT	-.022	-.018	.015	-.005	-.003	.026	.004	-.006	-.006	.005	.010	-.005
		(-7.333)	(-6.000)	(5.000)	(-1.667)	(-1.000)	(6.500)	(1.333)	(-2.000)	(-2.000)	(1.667)	(3.333)	(-1.667)
HD 3	BETA	.916	.848	.906	.922	.904	.932	.922	.926	.915	.942	.955	.893
	ABRT	-.033	-.019	.005	-.002	-.009	.028	-.003	-.007	-.005	-.001	.002	-.008
		(-11.000)	(-6.333)	(1.667)	(-.667)	(-4.500)	(7.000)	(-1.500)	(-3.500)	(-2.500)	(-.333)	(.667)	(-4.000)
HD 4	BETA	.880	.856	.879	.885	.890	.870	.905	.893	.907	.888	.916	.875
	ABRT	-.032	-.020	-.007	-.008	-.018	.014	-.007	-.001	-.008	-.011	-.008	-.016
		(-10.667)	(-6.667)	(-2.333)	(-2.667)	(-9.000)	(4.667)	(-3.500)	(-3.000)	(-4.000)	(-5.500)	(-2.667)	(-5.333)
HD 5	BETA	.876	.867	.889	.858	.891	.865	.862	.867	.891	.895	.898	.874
	ABRT	-.042	-.019	-.009	-.013	-.008	.007	-.016	-.017	-.013	-.012	-.003	-.016
		(-14.000)	(-9.500)	(-4.500)	(-6.500)	(-2.667)	(2.333)	(-8.000)	(-8.500)	(-6.500)	(-4.000)	(-1.000)	(-5.333)
HD 6	BETA	.883	.880	.880	.898	.865	.869	.864	.891	.878	.875	.863	.871
	ABRT	-.049	-.016	-.013	-.009	-.019	.006	-.013	-.015	-.014	-.010	-.016	-.021
		(-16.333)	(-5.333)	(-4.333)	(-4.500)	(-9.500)	(2.000)	(-6.500)	(-7.500)	(-7.000)	(-3.333)	(-8.000)	(-10.500)
HD 7	BETA	.884	.925	.898	.890	.879	.891	.880	.882	.894	.862	.886	.898
	ABRT	-.056	-.013	-.016	-.014	-.019	.010	-.016	-.013	-.017	-.015	-.016	-.024
		(-18.667)	(-4.333)	(-5.333)	(-7.000)	(-9.500)	(2.500)	(-8.000)	(-4.333)	(-8.500)	(-7.500)	(-8.000)	(-12.000)
HD 8	BETA	.904	.956	.902	.920	.918	.888	.893	.897	.907	.882	.883	.941
	ABRT	-.053	-.009	-.013	.010	-.011	.008	-.023	-.011	-.015	-.021	-.012	-.022
		(-17.667)	(-3.000)	(-4.333)	(-5.000)	(-3.667)	(-2.667)	(-11.500)	(-5.500)	(-7.500)	(-10.500)	(-4.000)	(-11.000)
HD 9	BETA	.947	1.041	.933	.968	.944	.950	.943	.970	.932	.937	.916	.997
	ABRT	-.052	-.004	-.010	-.013	-.019	.025	-.024	-.007	-.020	-.015	-.013	-.017
		(-17.333)	(-1.000)	(-3.333)	(-4.333)	(-6.333)	(6.250)	(-8.000)	(-2.333)	(-10.000)	(-5.000)	(-4.333)	(-5.667)
HD10	BETA	1.044	1.219	1.030	1.052	1.051	1.053	1.055	1.073	1.043	1.009	1.002	1.112
	ABRT	-.045	-.002	-.024	-.020	-.014	.057	-.031	-.015	-.020	-.023	-.001	-.023
		(-9.000)	(-.400)	(-6.000)	(-5.000)	(-3.500)	(9.500)	(-7.750)	(-3.750)	(-5.000)	(-5.750)	(-.200)	(-5.750)

t-values are in the parenthesis

In examining Table IV-6, however, note that January is not always the month of the highest return. June is the month of the highest overall abnormal returns. All portfolios show positive abnormal returns in June. The explanation for the positive abnormal June return is left unexplained. Thus, while the magnitude of the return has been reduced after risk-adjustment , the patterns of the return movement of each portfolios are the same before and after risk-adjustment. This reduction may, however, be due as much to changes in the composition of the samples as to the risk-adjustment itself.

The above results seem to confirm most of the findings of the preliminary study. The losers of one month tend to outperform the market and the winners of one month tend to be outperformed by the market in the following month even after risk-adjustment. Year-by-Year comparision of the risk-adjusted monthly abnormal returns are reported in Table IV-7 through Table IV-18.

Table IV-7

Abnormal Returns to the January Portfolio

		1975	1976	1977	1978	1979	1980	1981	1982
HD 1	BETA	.935	.888	.912	.892	.933	.882	.850	.909
	ABRT	-.009	-.013	.008	-.012	.006	-.004	-.009	-.006
		(-1.000)	(-1.182)	(.800)	(-1.333)	(.545)	(-.400)	(-.900)	(-.667)
HD 2	BETA	.886	.878	.877	.846	.865	.839	.843	.887
	ABRT	-.011	-.026	-.015	-.013	-.013	-.029	-.023	-.010
		(-1.375)	(-3.250)	(-2.143)	(-1.625)	(-1.857)	(-3.625)	(-3.286)	(-1.250)
HD 3	BETA	.837	.869	.841	.867	.843	.841	.829	.856
	ABRT	-.020	-.016	-.023	-.029	-.020	-.011	-.027	-.006
		(-2.857)	(-2.286)	(-3.286)	(-4.143)	(-3.333)	(-1.375)	(-4.500)	(-.750)
HD 4	BETA	.879	.842	.852	.850	.867	.824	.862	.876
	ABRT	-.015	-.013	-.014	-.031	-.016	-.031	-.026	-.016
		(-1.667)	(-1.625)	(-2.000)	(-5.167)	(-2.667)	(-5.167)	(-3.714)	(-2.286)
HD 5	BETA	.881	.887	.879	.860	.846	.863	.853	.865
	ABRT	-.034	-.017	-.010	-.015	-.018	-.023	-.025	-.014
		(-5.667)	(-2.833)	(-1.429)	(-2.143)	(-3.000)	(-3.286)	(-4.167)	(-2.333)
HD 6	BETA	.885	.868	.882	.906	.880	.847	.911	.924
	ABRT	-.015	-.018	-.028	-.022	-.016	-.007	-.008	-.011
		(-1.667)	(-3.000)	(-4.000)	(-3.143)	(-2.286)	(-.778)	(-1.143)	(-1.571)
HD 7	BETA	.915	.921	.944	.901	.943	.918	.904	.962
	ABRT	-.014	-.024	-.008	-.009	-.006	-.010	-.014	-.013
		(-1.750)	(-3.000)	(-1.000)	(-1.125)	(-.857)	(-1.111)	(-2.000)	(-1.444)
HD 8	BETA	.956	.960	.969	.947	.941	.932	.977	.973
	ABRT	-.003	-.011	-.020	-.014	-.001	.009	-.014	-.019
		(-.429)	(-1.222)	(-2.500)	(-2.000)	(-.125)	(.900)	(-1.556)	(-2.714)
HD 9	BETA	1.061	1.031	1.057	.999	1.037	1.041	1.034	1.064
	ABRT	-.001	.003	-.027	-.012	-.019	.006	-.006	.017
		(-.100)	(.333)	(-3.375)	(-1.500)	(-2.375)	(.545)	(-.750)	(.810)
HD10	BETA	1.267	1.209	1.333	1.201	1.195	1.172	1.187	1.194
	ABRT	-.016	.010	.006	-.024	.021	-.013	.013	-.008
		(-1.231)	(.714)	(.500)	(-1.714)	(1.313)	(-1.182)	(1.000)	(-.615)

t-values are in the parenthesis

Table IV-8

Abnormal Returns to the February Portfolio

		1975	1976	1977	1978	1979	1980	1981	1982
HD 1	BETA	1.081	1.062	1.119	1.080	1.014	1.027	.964	1.039
	ABRT	.054	.040	.064	.056	.042	.028	.016	.054
		(3.000)	(3.333)	(3.556)	(2.545)	(3.231)	(2.545)	(1.778)	(4.500)
HD 2	BETA	.985	.930	1.006	.917	1.007	.935	.951	.964
	ABRT	.009	.011	.015	.011	.023	.016	.022	.014
		(1.286)	(1.375)	(1.667)	(1.222)	(2.875)	(2.667)	(2.500)	(1.750)
HD 3	BETA	.925	.891	.911	.885	.891	.887	.906	.956
	ABRT	.003	.003	.014	.001	.007	-.005	.006	.014
		(.375)	(.429)	(1.750)	(.143)	(.778)	(-.714)	(.667)	(1.750)
HD 4	BETA	.879	.844	.888	.899	.882	.865	.875	.908
	ABRT	-.004	-.004	.003	-.008	-.008	-.021	-.014	-.004
		(-.571)	(-.571)	(.375)	(-1.000)	(-1.333)	(-4.200)	(-1.750)	(-.500)
HD 5	BETA	.937	.870	.879	.878	.867	.873	.917	.887
	ABRT	.002	-.007	-.001	-.015	-.016	-.019	-.007	-.008
		(.250)	(-1.167)	(-.125)	(-2.500)	(-2.667)	(-2.714)	(-.875)	(-1.143)
HD 6	BETA	.889	.881	.875	.863	.881	.884	.874	.891
	ABRT	-.008	-.026	-.023	-.014	-.004	-.014	-.010	-.007
		(-.615)	(-3.714)	(-3.833)	(-2.000)	(-.571)	(-2.000)	(-1.250)	(-1.000)
HD 7	BETA	.915	.903	.913	.896	.878	.852	.906	.912
	ABRT	-.016	-.015	-.007	-.013	-.020	-.029	-.007	-.018
		(-2.286)	(-2.143)	(-.875)	(-1.625)	(-2.500)	(-3.625)	(-.778)	(-2.571)
HD 8	BETA	.903	.925	.909	.902	.882	.908	.877	.911
	ABRT	-.023	-.003	.002	-.015	-.019	-.011	-.022	-.017
		(-3.286)	(-.375)	(.182)	(-1.875)	(-2.375)	(-1.571)	(-3.667)	(-2.429)
HD 9	BETA	.930	.957	.939	.921	.940	.888	.922	.970
	ABRT	-.007	-.001	.005	-.025	-.011	-.030	-.017	.009
		(-.778)	(-.100)	(.556)	(-3.125)	(-1.571)	(-3.750)	(-2.125)	(1.000)
HD10	BETA	1.051	1.106	1.013	.994	1.044	1.011	.978	1.036
	ABRT	-.025	-.018	-.022	-.035	-.004	-.032	-.042	-.015
		(-1.786)	(-1.286)	(-2.200)	(-3.500)	(-.308)	(-2.667)	(-3.000)	(-1.154)

t-values are in the parenthesis

Table IV-9

Abnormal Returns to the March Portfolio

		1975	1976	1977	1978	1979	1980	1981	1982
HD 1	BETA	1.078	1.065	1.176	.994	1.038	1.010	.996	1.015
	ABRT	.023	.021	.004	.016	.050	.022	.004	-.014
		(2.091)	(1.909)	(.333)	(1.143)	(2.381)	(1.692)	(.400)	(-1.077)
HD 2	BETA	.950	.958	.895	.883	.926	.917	.901	.917
	ABRT	.008	.010	-.015	0.000	.002	-.009	-.014	0.000
		(1.000)	(-1.000)	(-2.143)	(0.000)	(.250)	(-1.125)	(-2.000)	(0.000)
HD 3	BETA	.893	.913	.998	.891	.892	.931	.926	.932
	ABRT	-.004	-.009	.009	0.000	-.010	-.011	.002	.005
		(-.571)	(-1.125)	(1.000)	(0.000)	(-.143)	(-1.571)	(.222)	(.714)
HD 4	BETA	.902	.921	.853	.921	.856	.873	.876	.873
	ABRT	-.005	-.006	-.012	.001	-.020	-.012	-.008	-.003
		(-.833)	(-.667)	(-1.714)	(.125)	(-3.333)	(-2.000)	(-1.143)	(-.375)
HD 5	BETA	.875	.834	.882	.853	.868	.798	.864	.893
	ABRT	-.006	-.014	-.014	-.016	-.005	-.026	-.013	-.007
		(-1.000)	(-2.333)	(-2.333)	(-3.200)	(-.714)	(-4.333)	(-2.167)	(-1.167)
HD 6	BETA	.918	.892	.892	.883	.902	.884	.902	.907
	ABRT	-.007	-.005	-.021	-.006	-.005	-.005	-.015	-.006
		(-1.000)	(-.714)	(-3.500)	(-.857)	(-.833)	(-.833)	(-2.143)	(-.857)
HD 7	BETA	.899	.892	.909	.906	.895	.865	.845	.913
	ABRT	-.013	-.004	-.002	-.012	-.017	-.018	-.025	-.027
		(-2.167)	(-.667)	(-.286)	(-2.000)	(-2.429)	(-3.000)	(-4.167)	(-3.857)
HD 8	BETA	.924	.915	.935	.912	.920	.910	.933	.908
	ABRT	-.014	-.014	-.012	-.024	.003	.004	-.008	-.013
		(-2.333)	(-2.000)	(-2.400)	(-3.429)	(.375)	(.500)	(-1.143)	(-2.167)
HD 9	BETA	1.043	.962	.962	.944	.965	.950	.927	.996
	ABRT	-.016	-.014	-.016	-.018	-.013	-.006	-.015	-.010
		(-2.000)	(-2.000)	(-1.778)	(-2.250)	(-1.625)	(-.750)	(-1.875)	(-1.250)
HD10	BETA	1.025	1.027	1.092	1.038	1.066	1.000	1.026	1.124
	ABRT	-.035	-.013	-.020	-.003	-.018	-.034	-.024	-.013
		(-3.889)	(-.929)	(-1.667)	(-.273)	(-1.800)	(-3.091)	(-2.000)	(-1.182)

t-values are in the parenthesis

Table IV-10

Abnormal Returns to the April Portfolio

		1975	1976	1977	1978	1979	1980	1981	1982
HD 1	BETA	1.065	1.052	1.109	1.065	1.053	.992	1.035	1.041
	ABRT	.037	.019	.008	.024	-.011	.012	.038	.026
		(2.846)	(1.462)	(.615)	(2.000)	(-1.222)	(.923)	(2.714)	(2.000)
HD 2	BETA	.975	.980	.960	.919	.990	.902	.918	.920
	ABRT	.006	0.000	-.009	-.003	.009	-.013	0.000	-.008
		(.750)	(0.000)	(-1.500)	(-.300)	(.900)	(-1.625)	(0.000)	(-1.000)
HD 3	BETA	.928	.909	.929	.873	.880	.882	.889	.949
	ABRT	-.018	-.015	-.004	.001	-.008	-.017	-.010	-.001
		(-2.250)	(-2.500)	(-.571)	(.143)	(-1.000)	(-2.833)	(-1.667)	(-.167)
HD 4	BETA	.917	.862	.901	.880	.897	.838	.888	.928
	ABRT	-.014	-.026	-.016	-.019	-.016	-.018	-.028	-.010
		(-1.750)	(-4.333)	(-2.286)	(-2.714)	(-2.667)	(-2.571)	(-4.667)	(-1.667)
HD 5	BETA	.916	.885	.884	.879	.880	.873	.883	.929
	ABRT	-.003	-.015	-.006	-.006	-.011	-.010	-.006	-.009
		(-.333)	(-2.143)	(-.857)	(-.750)	(-1.571)	(-1.250)	(-.750)	(-1.286)
HD 6	BETA	.889	.862	.872	.864	.856	.862	.820	.893
	ABRT	-.011	-.018	-.025	-.022	-.024	-.023	-.017	-.013
		(-1.833)	(-3.000)	(-4.667)	(-3.667)	(-4.800)	(-3.833)	(-2.429)	(-2.167)
HD 7	BETA	.883	.868	.891	.876	.872	.868	.871	.900
	ABRT	-.019	-.017	-.010	-.019	-.020	-.020	-.021	-.030
		(-2.714)	(-2.429)	(-1.111)	(-2.714)	(-2.857)	(-3.333)	(-3.500)	(-5.000)
HD 8	BETA	.941	.923	.915	.896	.912	.921	.917	.917
	ABRT	-.011	-.021	-.003	-.014	-.018	-.012	.006	-.015
		(-1.833)	(-3.500)	(-.375)	(-2.333)	(-2.571)	(-1.500)	(.750)	(-2.143)
HD 9	BETA	.959	.910	.955	.947	.977	.941	.924	.940
	ABRT	-.025	-.031	-.003	-.025	-.005	-.011	-.027	-.022
		(-3.571)	(-4.429)	(-.375)	(-3.571)	(-.625)	(-1.375)	(-4.500)	(-3.143)
HD10	BETA	1.022	1.108	1.078	1.047	1.002	1.042	1.074	1.039
	ABRT	-.020	-.008	-.006	-.027	-.007	-.025	-.011	-.009
		(-2.000)	(-.727)	(-.429)	(-2.700)	(-.538)	(-2.778)	(-1.000)	(-.818)

t-values are in the parenthesis

Table IV-11

Abnormal Returns to the May Portfolio

		1975	1976	1977	1978	1979	1980	1981	1982
HD 1	BETA	1.057	1.051	1.115	1.072	1.066	1.106	1.051	1.025
	ABRT	.057	.062	.033	.050	.065	.050	.064	.035
		(3.167)	(3.875)	(2.200)	(3.278)	(3.824)	(3.333)	(3.556)	(2.692)
HD 2	BETA	.977	.916	.976	.957	.916	.929	.954	.977
	ABRT	.039	.037	.029	.008	.008	.032	.017	.035
		(3.545)	(3.700)	(2.900)	(.889)	(.800)	(2.909)	(1.700)	(3.182)
HD 3	BETA	.985	.962	.946	.894	.935	.898	.908	.922
	ABRT	.041	.038	.024	.024	.024	.018	.018	.035
		(3.727)	(4.222)	(2.667)	(2.667)	(2.400)	(1.800)	(1.286)	(3.500)
HD 4	BETA	.905	.887	.881	.852	.848	.857	.866	.867
	ABRT	.001	.019	.011	.017	.014	.015	.005	.027
		(.100)	(2.375)	(1.222)	(2.125)	(1.750)	(1.875)	(.625)	(2.700)
HD 5	BETA	.864	.840	.851	.873	.871	.861	.866	.876
	ABRT	-.005	-.002	.005	.022	0.000	.012	.007	.015
		(-.714)	(-.286)	(.500)	(2.444)	(0.000)	(1.200)	(.778)	(1.667)
HD 6	BETA	.884	.893	.887	.854	.853	.850	.861	.866
	ABRT	-.005	.019	.001	0.000	-.001	.023	-.002	.012
		(-.625)	(2.375)	(.143)	(0.000)	(-.125)	(1.917)	(-.250)	(1.333)
HD 7	BETA	.887	.909	.873	.877	.878	.883	.874	.952
	ABRT	.030	.009	-.002	.003	.021	.005	-.002	.018
		(2.308)	(1.000)	(-.222)	(.250)	(2.333)	(.500)	(-.167)	(1.636)
HD 8	BETA	.891	.913	.881	.886	.892	.848	.865	.930
	ABRT	.005	.005	.013	-.010	.013	.017	.008	.012
		(.625)	(.625)	(1.625)	(-1.425)	(1.444)	(1.545)	(.800)	(1.333)
HD 9	BETA	.982	.930	.976	.921	.950	.932	.921	.972
	ABRT	.026	.018	.026	.029	.024	.016	.045	.020
		(2.364)	(1.800)	(2.364)	(2.417)	(1.846)	(1.778)	(3.750)	(2.222)
HD10	BETA	1.028	1.054	1.090	1.040	1.111	1.000	1.041	1.065
	ABRT	.034	.050	.074	.054	.069	.048	.047	.062
		(4.154)	(3.333)	(4.111)	(3.600)	(3.450)	(3.692)	(3.133)	(3.647)

t-values are in the parenthesis

Table IV-12

Abnormal Returns to the June Portfolio

		1975	1976	1977	1978	1979	1980	1981	1982
HD 1	BETA	1.085	1.093	1.123	1.034	1.065	1.013	1.055	1.082
	ABRT	.007	.027	.014	.029	.025	.027	.006	.026
		(.636)	(1.929)	(1.273)	(1.933)	(1.923)	(2.455)	(.667)	(2.364)
HD 2	BETA	1.037	.969	1.003	.981	1.000	.974	.963	1.013
	ABRT	.006	.014	-.001	-.006	.004	-.001	.001	.018
		(.750)	(1.750)	(-.125)	(-.857)	(.571)	(-.125)	(.143)	(2.250)
HD 3	BETA	.934	.954	.906	.920	.899	.940	.857	.945
	ABRT	-.005	-.011	-.002	-.006	-.012	.014	-.018	.013
		(-.714)	(-1.571)	(-.333)	(-.857)	(-2.000)	(1.556)	(-3.000)	(1.625)
HD 4	BETA	.893	.925	.901	.912	.890	.906	.894	.918
	ABRT	-.018	-.004	-.001	-.001	-.013	-.007	-.006	-.005
		(-2.571)	(-.571)	(-.125)	(-.143)	(-2.167)	(-1.000)	(-1.000)	(-.714)
HD 5	BETA	.858	.862	.867	.835	.854	.853	.878	.890
	ABRT	-.011	-.015	-.018	-.019	-.024	-.016	-.014	-.012
		(-1.833)	(-2.500)	(-3.600)	(-3.800)	(-4.800)	(-3.200)	(-2.000)	(-1.714)
HD 6	BETA	.890	.838	.872	.857	.902	.810	.864	.881
	ABRT	-.012	-.017	-.005	-.014	.002	-.023	-.026	-.007
		(-2.000)	(-2.833)	(-.714)	(-2.000)	(.250)	(-3.833)	(-4.333)	(-1.167)
HD 7	BETA	.868	.872	.928	.884	.875	.868	.849	.893
	ABRT	-.019	-.015	-.011	-.005	-.020	-.020	-.025	-.012
		(-2.714)	(-2.143)	(-1.843)	(-.556)	(-3.333)	(-2.857)	(-4.167)	(-2.000)
HD 8	BETA	.908	.892	.926	.881	.848	.863	.902	.923
	ABRT	-.023	-.015	-.027	-.032	-.027	-.024	-.013	-.020
		(-3.833)	(-1.667)	(-4.500)	(-5.333)	(-4.500)	(-4.000)	(-2.167)	(-2.857)
HD 9	BETA	.970	.941	.967	.953	.942	.900	.910	.955
	ABRT	-.019	-.018	-.008	-.026	-.034	-.037	-.029	-.019
		(-2.375)	(-.125)	(-1.000)	(-3.714)	(-5.667)	(-5.286)	(-4.833)	(-2.714)
HD10	BETA	1.101	1.055	1.025	1.037	1.089	1.066	1.046	1.016
	ABRT	-.021	-.040	-.042	-.024	-.037	-.047	-.021	-.014
		(-2.333)	(-3.636)	(-4.200)	(-2.000)	(-3.700)	(-4.273)	(-2.100)	(-1.400)

t-values are in the parenthesis

Table IV-13

Abnormal Returns to the July Portfolio

		1975	1976	1977	1978	1979	1980	1981	1982
HD 1	BETA	1.024	1.019	1.019	1.089	1.066	.975	1.065	1.016
	ABRT	.009	.005	.030	.017	.015	.008	.022	-.001
		(.692)	(.556)	(2.000)	(1.417)	(1.364)	(.800)	(1.692)	(-.100)
HD 2	BETA	1.016	.937	.931	.895	.928	.949	.899	.969
	ABRT	-.014	.003	-.017	-.001	-.009	.004	-.022	.003
		(-2.000)	(.333)	(-2.125)	(-.125)	(-1.125)	(.308)	(-4.400)	(.300)
HD 3	BETA	.946	.917	.940	.924	.921	.895	.907	.971
	ABRT	-.014	-.009	-.010	-.002	-.011	-.007	-.012	.006
		(-2.333)	(-1.286)	(-1.425)	(-.333)	(-1.571)	(-1.167)	(-2.000)	(.667)
HD 4	BETA	.913	.916	.916	.859	.886	.882	.893	.883
	ABRT	-.010	-.007	-.005	-.006	-.011	-.003	-.003	-.001
		(-1.667)	(-1.000)	(-.625)	(-.857)	(-1.833)	(-.500)	(-.429)	(-.143)
HD 5	BETA	.857	.847	.912	.827	.855	.827	.899	.902
	ABRT	-.010	-.014	-.025	-.027	-.026	-.017	-.014	0.000
		(-1.429)	(-2.333)	(-4.167)	(-4.500)	(-4.333)	(-3.400)	(-2.333)	(0.000)
HD 6	BETA	.930	.878	.933	.896	.881	.834	.867	.914
	ABRT	-.011	-.005	-.016	-.028	-.021	-.016	-.009	-.015
		(-1.571)	(-.500)	(-2.667)	(-4.000)	(-3.500)	(-2.667)	(-1.500)	(-2.143)
HD 7	BETA	.878	.898	.857	.877	.873	.860	.881	.933
	ABRT	-.009	-.005	-.008	-.008	-.020	-.015	-.022	-.017
		(-1.125)	(-.714)	(-.889)	(-1.143)	(-2.857)	(-2.143)	(-3.143)	(-2.833)
HD 8	BETA	.924	.906	.902	.885	.901	.879	.884	.895
	ABRT	-.008	-.018	-.017	-.009	-.001	-.006	-.015	-.012
		(-1.143)	(-3.000)	(-3.400)	(-1.286)	(-.111)	(-.750)	(-2.500)	(-1.714)
HD 9	BETA	.966	.971	.948	.992	1.002	.972	.938	.973
	ABRT	-.010	-.010	-.009	-.007	-.005	.002	-.008	-.012
		(-1.429)	(-1.429)	(-1.125)	(-.778)	(-.625)	(.222)	(-1.333)	(-1.333)
HD10	BETA	1.134	1.096	1.084	1.071	1.053	1.092	1.017	1.048
	ABRT	-.006	-.022	-.009	-.020	-.021	-.023	.013	-.025
		(-.462)	(-2.444)	(-.818)	(-1.538)	(-1.615)	(-1.769)	(.929)	(-2.500)

t-values are in the parenthesis

Table IV-14

Abnormal Returns to the August Portfolio

		1975	1976	1977	1978	1979	1980	1981	1982
HD 1	BETA	1.099	1.010	1.169	1.003	1.093	1.039	1.092	1.036
	ABRT	.012	.015	.058	.036	.042	.002	.010	.013
		(1.091)	(1.500)	(3.625)	(1.565)	(3.818)	(.200)	(.909)	(1.083)
HD 2	BETA	.972	.938	.962	.934	.970	.895	.934	1.000
	ABRT	-.007	.016	-.001	-.005	.001	-.018	.002	-.001
		(-1.000)	(-2.667)	(-.143)	(-.625)	(.167)	(-2.571)	(.250)	(-.125)
HD 3	BETA	.946	.907	.922	.943	.913	.875	.911	.905
	ABRT	-.007	-.001	-.006	-.010	0.000	-.009	.002	-.007
		(-1.000)	(-.167)	(-.857)	(-1.667)	(0.000)	(-1.500)	(.400)	(-1.000)
HD 4	BETA	.924	.914	.913	.911	.872	.907	.896	.919
	ABRT	-.008	-.015	-.007	-.002	-.013	-.012	-.009	-.001
		(-1.333)	(-2.143)	(-1.167)	(-.222)	(-1.857)	(-2.000)	(-1.286)	(-.143)
HD 5	BETA	.887	.882	.879	.899	.892	.888	.905	.900
	ABRT	-.014	-.009	-.011	-.013	-.012	-.018	-.004	-.024
		(-2.800)	(-1.500)	(-1.833)	(-2.167)	(-2.000)	(-3.000)	(-.667)	(-4.800)
HD 6	BETA	.893	.889	.887	.854	.877	.859	.847	.919
	ABRT	-.016	-.003	-.013	-.017	-.017	-.008	-.021	-.014
		(-3.200)	(-.429)	(-1.522)	(-3.400)	(-3.400)	(-1.600)	(-3.500)	(-2.333)
HD 7	BETA	.936	.920	.899	.903	.897	.869	.840	.891
	ABRT	-.015	-.014	-.020	-.012	-.025	-.014	-.023	-.013
		(-2.143)	(-2.333)	(-3.333)	(-2.000)	(-4.167)	(-2.333)	(-4.600)	(-2.167)
HD 8	BETA	.928	.930	.920	.869	.887	.913	.876	.944
	ABRT	-.003	-.027	-.019	-.035	-.007	-.012	-.014	-.002
		(-.375)	(-4.500)	(-3.167)	(-7.000)	(-1.167)	(-2.400)	(-2.000)	(-.286)
HD 9	BETA	.948	.932	.933	.930	.925	.910	.964	.918
	ABRT	-.021	-.016	-.022	-.013	-.026	-.025	-.020	-.013
		(-3.000)	(-2.667)	(-.333)	(-1.857)	(-4.333)	(-4.167)	(-2.857)	(-1.857)
HD10	BETA	1.021	1.059	1.085	.993	1.030	1.044	1.020	1.092
	ABRT	-.022	-.021	-.022	-.021	-.025	-.018	-.009	-.023
		(-2.444)	(-2.100)	(-2.444)	(-2.333)	(-2.500)	(-1.800)	(-.900)	(-1.917)

t-values are in the parenthesis

Table IV-15

Abnormal Returns to the September Portfolio

		1975	1976	1977	1978	1979	1980	1981	1982
HD 1	BETA	1.181	1.152	1.157	1.104	1.054	1.146	1.148	1.168
	ABRT	.017	.061	.023	.003	-.013	-.013	.047	.042
		(1.545)	(1.794)	(1.533)	(.214)	(-1.083)	(-1.182)	(3.133)	(3.500)
HD 2	BETA	1.002	1.025	.982	.996	.986	.977	.988	1.007
	ABRT	.016	.012	.007	-.004	-.002	-.006	-.006	.024
		(1.778)	(1.500)	(1.000)	(-.500)	(-.214)	(-.667)	(-.750)	(2.667)
HD 3	BETA	.960	.950	.946	.918	.921	.924	.942	.973
	ABRT	.005	-.004	-.005	-.005	.001	-.010	.004	.006
		(.714)	(-.571)	(-.625)	(-.714)	(.167)	(-.833)	(.571)	(.750)
HD 4	BETA	.893	.914	.896	.848	.892	.863	.897	.906
	ABRT	-.006	-.012	-.008	-.015	-.007	-.011	-.013	-.017
		(-.857)	(-2.000)	(-1.333)	(-2.143)	(-1.000)	(-1.833)	(-2.167)	(-2.833)
HD 5	BETA	.903	.882	.916	.885	.899	.898	.852	.922
	ABRT	-.016	-.009	-.006	-.016	-.005	-.008	-.016	-.018
		(-2.286)	(-1.286)	(-.857)	(-1.600)	(-.833)	(-1.143)	(-2.286)	(-2.571)
HD 6	BETA	.871	.870	.872	.879	.870	.880	.857	.904
	ABRT	-.022	-.002	.005	-.012	0.000	-.013	-.015	-.022
		(-3.667)	(-.333)	(.714)	(-2.000)	(0.000)	(-2.600)	(-2.500)	(-3.667)
HD 7	BETA	.900	.857	.899	.847	.871	.805	.871	.841
	ABRT	-.012	-.015	-.017	-.017	-.008	-.024	-.019	-.004
		(-1.714)	(-2.500)	(-2.833)	(-2.833)	(-1.333)	(-4.000)	(-3.167)	(-.571)
HD 8	BETA	.898	.879	.874	.872	.902	.866	.887	.876
	ABRT	-.017	-.014	-.024	-.023	-.020	-.027	-.023	-.020
		(-2.429)	(-1.750)	(-4.000)	(-3.833)	(-3.333)	(-4.500)	(-3.833)	(-3.333)
HD 9	BETA	.953	.952	.969	.970	.955	.911	.875	.924
	ABRT	-.008	-.020	-.014	-.015	-.024	-.003	-.014	-.023
		(-1.000)	(-2.857)	(-1.400)	(-2.143)	(-2.400)	(-.333)	(-2.000)	(-3.286)
HD10	BETA	1.026	.948	1.047	1.008	1.036	.974	.986	1.025
	ABRT	-.019	-.029	-.013	-.041	-.023	-.025	-.024	-.014
		(-1.727)	(-2.231)	(-.929)	(-3.727)	(-2.300)	(-1.923)	(-2.400)	(-1.167)

t-values are in the parenthesis

Table IV-16

Abnormal Returns to the October Portfolio

		1975	1976	1977	1978	1979	1980	1981	1982
HD 1	BETA	1.112	1.118	1.105	1.050	1.125	1.066	1.080	1.103
	ABRT	.063	.052	.021	.019	.025	.043	.034	.044
		(4.846)	(3.467)	(1.400)	(1.462)	(1.923)	(2.867)	(2.125)	(2.750)
HD 2	BETA	.993	.986	1.017	.981	.949	.975	1.035	1.032
	ABRT	.017	.013	.020	-.006	-.006	.004	.025	.012
		(1.700)	(1.444)	(2.000)	(-.750)	(-.667)	(.444)	(.455)	(1.500)
HD 3	BETA	1.050	.977	.961	.901	.933	.928	.905	.982
	ABRT	.011	.005	.007	-.009	.001	-.006	.005	.002
		(1.222)	(.556)	(.778)	(-1.125)	(.100)	(-.857)	(.500)	(.250)
HD 4	BETA	.895	.890	.911	.912	.939	.905	.934	.941
	ABRT	-.018	-.017	-.010	-.014	.004	.004	-.016	-.003
		(-2.250)	(-2.429)	(-1.250)	(-2.000)	(.444)	(.500)	(-2.286)	(-.375)
HD 5	BETA	.904	.904	.929	.899	.880	.882	.897	.890
	ABRT	-.011	-.014	.001	.006	-.006	-.001	.011	-.007
		(-1.586)	(-2.333)	(.111)	(.857)	(-.857)	(-.143)	(1.100)	(-.875)
HD 6	BETA	.865	.892	.879	.843	.876	.839	.835	.871
	ABRT	-.023	-.020	-.017	-.020	-.011	-.015	-.022	-.001
		(-3.286)	(-3.333)	(-3.400)	(-2.222)	(-1.833)	(-2.143)	(-3.667)	(-.125)
HD 7	BETA	.906	.875	.883	.879	.902	.853	.893	.899
	ABRT	-.006	-.025	-.011	-.014	-.018	-.017	-.020	-.014
		(-.750)	(-4.167)	(-1.833)	(-2.333)	(-3.000)	(-2.125)	(-3.333)	(-2.333)
HD 8	BETA	.907	.863	.900	.881	.896	.879	.839	.898
	ABRT	-.022	-.009	-.007	-.022	-.007	-.010	-.013	-.010
		(-3.143)	(-.818)	(-1.000)	(-3.667)	(-.875)	(-1.250)	(-2.167)	(-1.250)
HD 9	BETA	.917	.914	.938	.911	.903	.891	.891	.961
	ABRT	-.003	-.019	-.007	-.023	-.018	-.014	-.007	-.017
		(-.429)	(-2.375)	(-1.000)	(-2.875)	(-2,571)	(-2.000)	(-.875)	(-2.429)
HD10	BETA	1.014	1.033	1.020	1.026	.979	.974	.963	1.004
	ABRT	.006	.007	-.007	-.014	-.013	-.011	.006	.013
		(.429)	(.538)	(-.700)	(-1.167)	(-1.000)	(-1.000)	(.545)	(.684)

t-values are in the parenthesis

Table IV-17

Abnormal Returns to the November Portfolio

		1975	1976	1977	1978	1979	1980	1981	1982
HD 1	BETA	1.022	.995	1.084	1.012	1.034	.974	.993	.956
	ABRT	.039	.028	.023	.046	.014	.013	.008	.012
		(2.294)	(2.545)	(2.091)	(2.706)	(1.167)	(1.182)	(.471)	(.857)
HD 2	BETA	.910	.921	.936	.864	.953	.923	.924	.907
	ABRT	.002	-.006	.002	-.014	-.010	-.012	.011	-.010
		(.250)	(-.857)	(.333)	(2.333)	(-1.429)	(-1.714)	(1.375)	(-1.250)
HD 3	BETA	.894	.961	.887	.892	.870	.888	.906	.946
	ABRT	-.005	-.013	-.014	-.007	-.021	-.003	.005	-.005
		(-.714)	(-2.167)	(-2.333)	(-1.000)	(-3.000)	(-.429)	(.625)	(-.714)
HD 4	BETA	.881	.861	.902	.884	.845	.849	.856	.926
	ABRT	-.026	-.013	-.007	-.011	-.032	-.021	0.000	-.019
		(-3.714)	(-1.857)	(-.778)	(-1.571)	(-6.400)	(-3.000)	(0.000)	(-2.714)
HD 5	BETA	.893	.915	.873	.880	.853	.826	.873	.870
	ABRT	-.008	-.010	-.019	-.024	-.003	-.025	-.020	-.021
		(-1.000)	(-1.429)	(-2.714)	(-4.000)	(-.273)	(-3.571)	(-2.857)	(-3.000)
HD 6	BETA	.844	.866	.903	.873	.888	.847	.865	.887
	ABRT	-.035	-.021	-.014	-.018	-.015	-.027	-.014	-.026
		(-5.833)	(-3.500)	(-2.333)	(-3.000)	(-3.000)	(-5.400)	(-2.333)	(-3.714)
HD 7	BETA	.930	.906	.911	.898	.892	.877	.874	.899
	ABRT	-.015	-.018	-.020	-.027	-.016	-.036	-.031	-.025
		(-2.500)	(-2.571)	(-3.333)	(-5.400)	(-2.667)	(-7.200)	(-5.167)	(-4.167)
HD 8	BETA	.970	.935	.952	.934	.945	.904	.915	.964
	ABRT	-.023	-.020	-.021	-.024	-.009	-.032	-.027	-.018
		(-3.833)	(-3.333)	(-3.500)	(-4.000)	(-1.125)	(-5.333)	(-3.857)	(-2.250)
HD 9	BETA	1.030	1.024	1.006	.958	.985	.964	.955	1.061
	ABRT	-.017	-.021	-.023	-.019	-.017	-.024	-.019	-.001
		(-2.125)	(-2.625)	(-3.286)	(-2.111)	(-2.125)	(-2.667)	(-2.111)	(-.143)
HD10	BETA	1.182	1.142	1.068	1.101	1.091	1.137	1.088	1.077
	ABRT	-.012	-.027	-.037	-.023	-.011	-.026	-.007	-.039
		(-.923)	(-3.000)	(-3.700)	(-1.643)	(-1.000)	(-2.167)	(-.500)	(-4.333)

t-values are in the parenthesis

Table IV-18

Abnormal Returns to the December Portfolio

		1975	1976	1977	1978	1979	1980	1981	1982
HD 1	BETA	1.105	1.164	1.183	1.033	1.032	1.094	1.035	1.119
	ABRT	.009	.023	.039	.022	.032	-.003	.029	.038
		(.563)	(1.769)	(2.167)	(1.222)	(1.684)	(-.214)	(1.261)	(2.533)
HD 2	BETA	.962	.967	1.030	.955	.962	.971	.928	.973
	ABRT	-.028	-.022	-.022	-.033	-.010	-.023	-.016	-.023
		(-3.111)	(-2.200)	(-2.200)	(-4.125)	(-.833)	(-2.556)	(-1.778)	(-2.300)
HD 3	BETA	.958	.928	.892	.909	.906	.894	..890	.951
	ABRT	-.053	-.033	-.048	-.030	-.030	-.013	-.023	-.035
		(-7.571)	(-4.714)	(-8.000)	(-4.286)	(-3.750)	(-1.182)	(-2.091)	(-4.375)
HD 4	BETA	.890	.867	.881	.869	.890	.871	.896	.877
	ABRT	-.041	-.028	-.036	-.021	-.031	-.026	-.042	-.032
		(-5.857)	(-4.000)	(-5.143)	(-2.333)	(-3.875)	(-3.714)	(-6.000)	(-4.571)
HD 5	BETA	.897	.907	.880	.883	.844	.849	.860	.892
	ABRT	-.041	-.040	-.045	-.037	-.050	-.027	-.044	-.052
		(-5.125)	(-5.000)	(-6.429)	(-5.286)	(-7.143)	(-2.700)	(-6.286)	(-6.500)
HD 6	BETA	.876	.884	.891	.886	.890	.869	.864	.909
	ABRT	-.036	-.043	-.044	-.061	-.057	-.057	-.052	-.038
		(-4.500)	(-5.375)	(-5.500)	(-8.714)	(-7.125)	(-8.143)	(-5.200)	(-5.429)
HD 7	BETA	.909	.862	.868	.863	.909	.825	.938	.901
	ABRT	-.042	-.057	-.058	-.062	-.068	-.059	-.060	-.045
		(-4.667)	(-9.500)	(-8.286)	(-8.857)	(-9.714)	(-8.429)	(-7.500)	(-5.000)
HD 8	BETA	.905	.891	.925	.909	.905	.894	.873	.934
	ABRT	-.044	-.057	-.051	-.050	-.056	-.056	-.062	-.051
		(-6.286)	(-8.143)	(-7.286)	(-5.000)	(-8.000)	(-7.000)	(-7.750)	(-7.286)
HD 9	BETA	.967	.937	.958	.925	.958	.928	.936	.968
	ABRT	-.038	-.051	-.059	-.064	-.052	-.046	-.053	-.049
		(-4.222)	(-5.667)	(-7.375)	(-7.111)	(-5.200)	(-5.750)	(-6.625)	(-6.125)
HD10	BETA	1.111	1.028	1.084	1.045	1.050	1.000	.984	1.049
	ABRT	-.053	-.027	-.045	-.043	-.032	-.058	-.058	-.045
		(-3.313)	(-2.700)	(-3.750)	(-3.071)	(-2.286)	(-3.412)	(-4.833)	(-3,462)

t-values are in the parenthesis

In almost every year, Portfolio HD1 and HD10 have the highest systematic risks and the pattern of the return movements do not differ from the aggregated results of Table IV-6. Portfolio HD1 (the losers) tend to have positive abnormal returns and Portfolio HD10 (the winners) tend to have negative returns in the following month.

As for the January returns of December Portfolio(Table IV-18), only Portfolio HD1 has the positive abnormal returns. And it ranged from -0.3% in 1981 to 3.9% in 1978. The abnormal returns to HD1 appear to fluctuate widely over time. In some years, the abnormal returns are about 4% and in some years they are even negative.

Before risk-adjustment (Table III-21), December portfolio HD1 has the highest market differential returns of 44.6% in 1974, 40.5% in 1981 and 37.1% in 1975. After risk-adjustment (Table IV-21), with the composition change, it has the highest return of 3.9% in 1978 and 3.8% in 1983. In 1981, it has, though not significant, a negative abnormal return. In some years, much of the apparent market differential returns seem to be explained by risk or by the composition change.

Summary of the Risk-Adjusted Study

Even after risk-adjustment, the losers of one month seem to outperform the market in the following month and the vice versa with the winners. As for January returns, only Portfolio HD1 (the losers) has positive abnormal returns which fluctuate widely over time and the magnitude does not seem to be large enough to cover the transaction costs. Risk or the composition change seems to explain most of the market differential returns found in the preliminary study. The high abnormal returns to portfolios in June is left unexplained.

Listing Effect

The high January returns seem to come largely from the losers of the previous December. Although the portfolio of the losers contain more small firm stocks, these stocks' performances do not seem to explain the high January return. The portfolio of the winners, which also contained more small firm stocks, had negative abnormal returns.

The AMEX and OTC companies are generally smaller than the NYSE-listed firms. The so-called size effect is examined in another way using dummy variables. Two dummy variables which denote each market have been created and

the following multiple regression has been run for the whole period of February 1970 to February 1983 for each month.

$$R_t = B_0 + B_1 R_{t-1} + B_2 D1 + B_3 D2 + B_4 (D_1 R_{t-1}) + B_5 (D_2 R_{t-1})$$

where R_t : unadjusted return of a stock at month t
R_{t-1} : unadjusted return of a stock at month t-1
D_1 : dummy variable that has the value of 1 when a stock belongs to the AMEX and 0 otherwise
D_2 : dummy variable that has the value of 1 when a stock belongs to the OTC and 0 otherwise.

Thus, for NYSE stocks, $R_t = B_0 + B_1 R_{t-1}$.

For AMEX stocks, $R_t = (B_0 + B_2) + (B_1 + B_4) R_{t-1}$.

For OTC stocks, $R_t = (B_0 + B_3) + (B_1 + B_5) R_{t-1}$.

The regression results are shown in Table IV-19.

The intercept term reflects the effect of the market for that month, while the slope term shows how the return of a stock that trades in a certain market at one month is associated with the return in the preceeding month. The noteworthy result is that of the December/January. The intercept term is much higher in magnitude than in the other months --- which implies that the effect of the market is much greater in January than in other months. This result is found for the whole market and each submarket. Moreover, the intercepts of the AMEX and OTC are more than twice as large as that of the NYSE.

The December return is generally inversely related to the January return. Thus, stocks with negative returns in

month t tend to rebound in month t+1 and vice versa. The strongest negative association is found for January and for the AMEX stocks. However, the differences in the negative association between the NYSE and the AMEX stocks are negligibly small. The OTC stocks show positive association, although not significant, in January. Except for OTC stocks, the losers of December seem to rebound in the following January.

The superior performance of the AMEX stocks relative to the NYSE stocks may result from their AMEX trading rather than the fact that they are small. During the 12 months, six slopes are negative for the NYSE, nine for the AMEX and eleven for the OTC. Thus, the rebound of the losers in the following month seems to be stronger throughout the year fot the AMEX and OTC stocks. As for the January returns, however, since the slopes for the NYSE group differ little from those of the AMEX, the overall January return does not appear to have been caused by the performance of the small firm stocks. Rather, the differences should be found in the intercept term. Regardless of whether a stock is a loser or a winner, the AMEX market effect is much stronger than that of the NYSE.

Table IV - 19

Listing Effect

		NYSE	AMEX	OTC
Dec/Jan	Intcpt	.064*	.135*	.136*
	Slope	-.269*	-.272*	.085
Jan/Feb	Intcpt	.001	.021*	.017*
	Slope	.065*	.003	.002
Feb/Mar	Intcpt	.014*	.017*	.014*
	Slope	-.017*	-.058*	-.084*
Mar/Apr	Intcpt	.003*	.002	.027*
	Slope	.023*	-.044*	-.035*
Apr/May	Intcpt	-.009*	-.009*	.008*
	Slope	.182*	.069*	-.006*
May/Jun	Intcpt	.005*	.004*	.006*
	Slope	.060*	-.018*	-.015*
Jun/Jul	Intcpt	.012*	.013*	.016*
	Slope	-.123*	-.152*	-.036*
Jul/Aug	Intcpt	.012*	.010*	.014*
	Slpoe	.046*	-.023*	-.024*
Aug/Sep	Intcpt	-.003*	-.002*	-.005*
	Slope	.056*	-.010*	-.004*
Sep/Oct	Intcpt	-.004*	-.014*	.017*
	Slope	-.198*	-.206*	-.124*
Oct/Nov	Intcpt	.021*	.010*	.026*
	Slope	-.040*	-.074*	-.040*
Nov/Dec	Intcpt	.016*	.006*	.020*
	Slope	-.024*	.004*	-.073*

* means they are significant at the 95 % significance level.

While the higher negative slope of December/January seems to support the tax-loss selling hypothesis, in that December losers tend to become January winners, the higher returns of the small firm stocks seem to come largely from the intercept implying that their small size or listing on a certain submarket caused the higher return.

The losers of the previous month seem more likely to be the candidates of the tax-loss selling than the winners are likely selling candidates, a regression for the positive and negative previous returns may more clearly reveal the true relation. Thus another regression with seperate slopes for winners and losers has been run for the same period.

$$R_t = B_0 + B_1 R_{t-1}^{+} + B_2 R_{t-1}^{-} + B_3 D1 + B_4 D2 + B_5 (D_1 R_{t-1}^{+}) + B_6(D_1 R_{t-1}^{-}) + B_7(D_2 R_{t-1}^{+}) + B_8(D_2 R_{t-1}^{-})$$

where R_t : return of a stock at month t
R_{t-1}^{+} : positive return of a stock at month t-1
R_{t-1}^{-} : negative return of a stock at month t-1
D_1 : dummy variable that has the value of 1 when a stock belongs to the AMEX and 0 otherwise
D_2 : dummy variable that has the value of 1 when a stock belongs to the OTC and 0 otherwise

Thus, for NYSE stocks, $R_t = B_0 + B_1 R_{t-1}^{+} + B_2 R_{t-1}^{-}$.

For AMEX stocks, $R_t = (B_0 + B_3) + (B_1 + B_5) R_{t-1}^{+} + (B_2 + B_6) R_{t-1}^{-}$.

For OTC stocks, $R_t = (B_0 + B_4) + (B_1 + B_7) R_{t-1}^{+} + (B_2 + B_8) R_{t-1}^{-}$.

Table IV - 20

Listing Effect for Winners and Losers

		NYSE	AMEX	OTC
Dec/Jan	Intcpt	.027*	.081*	.057*
	Winner	.095*	.121*	.001
	Loser	-.876*	-.954*	-1.577*
Jan/Feb	Intcpt	.004*	.026*	.018*
	Winner	.055*	-.002	.002*
	Loser	.152*	.160*	.038*
Feb/Mar	Intcpt	.016*	.014*	.013*
	Winner	-.041*	-.038*	-.086*
	Loser	.026*	-.114*	-.084*
Mar/Apr	Intcpt	-.002*	.014*	.013*
	Winner	.058*	-.023*	-.022*
	Loser	-.036*	-.082*	-.144*
Apr/May	Intcpt	.001	-.002*	.007*
	Winner	.069*	.024*	-.006*
	Loser	.308*	.145*	-.016*
May/Jun	Intcpt	.009*	.003*	.001
	Winner	.019*	-.025*	.002
	Loser	.125*	-.026*	-.089*
Jun/Jul	Intcpt	.010*	-.002*	.012*
	Winner	-.104*	-.037*	-.022*
	Loser	-.150*	-.363*	-.096*
Jul/Aug	Intcpt	.014*	.007*	.006*
	Winner	.013*	-.007*	.011*
	Loser	.101*	-.073*	-.139*
Aug/Sep	Intcpt	.004*	.006*	.001*
	Winner	-.014*	-.050*	-.032*
	Loser	.154*	.108*	.078*
Sep/Oct	Intcpt	-.018*	-.031*	-.011*
	Winner	-.045*	-.087*	.039*
	Loser	-.399*	-.409*	-.443*
Oct/Nov	Intcpt	.012*	-.005*	.015*
	Winner	.045*	.030*	-.014*
	Loser	-.153*	-.219*	-.184*
Nov/Dec	Intcpt	.025*	.015*	.018*
	Winner	-.126*	-.059*	-.067*
	Loser	.103*	.101*	-.089*

* means they are significant at the 95 % significance level

The intercept term reflects the effect of the market for the month while seperately entering positive and negative previous month returns allows different slopes for risers and decliners. The regression results are shown in Table IV-20.

Like Table IV-19, the intercept term is the highest in January --- implying again that the listing effect is the strongest in January for any exchange market and especially for AMEX. While the slopes of the risers in January are modestly positive and statistically not significant, the slopes of the losers are quite significantly negative. This time the losers of OTC show a quite significantly negative slope in January. Table IV-20 seems to confirm the results of Table IV-19 that the listing effect and the rebound of the losers are strongest in January.

The intercepts of the AMEX and OTC stocks are more than twice as large as that of the NYSE stocks in January, while the slopes are not. This result seems to suggest that the higher returns of the AMEX and OTC stocks in January is due either to the fact that most OTC and AMEX listings are smaller firms than NYSE stocks or from the fact that they belong to a certain market.

Summary of the Listing Effect

The losers of one month tend to rebound in the following month. The rebound of the December losers is the most pronounced. While the negative return associations of the losers are almost the same for the NYSE, AMEX and OTC stocks, the market effect is much stronger for the AMEX stocks, especially in January. The stronger performance of the AMEX and OTC stocks compared with the NYSE stocks seems to result from the fact that either they are small or they are traded in markets with different characteristics.

Chapter Summary

Portfolio HD1 seems to have more small firm stocks and low-priced stocks than a random distribution would lead us to expect throughout the year. If price or size themselves are the things that matter, these stocks are to outperform the large firm stocks and high-priced stocks not only in January but also in other months. Since we find the large returns only in January, it may be that year-end effect have more impacts on these stocks. While the pattern of the return movement does not differ before and after risk-adjustment, risk seems to explain most of the market differential returns to Portfolio HD1 in January.

Considering the change of composition in the sample, however, the composition could explain the reductions as much. While the losers of one month tend to rebound in the following month, the winners were considered to move randomly. The stocks traded in the AMEX and OTC seem to exhibit a higher listing effect than those in the NYSE.

C H A P T E R V

EXTENSIONS; STUDY OF THE BID-ASK SPREAD

The results reported in the previous chapters imply that losers of one month persistently outperform the market even after risk-adjustment. However, some researchers have raised doubts regarding the techniques normally used to compute portfolio returns. Roll (1983) argued that using arithmetic methods for computing portfolio returns tend to exaggerate the actual (true) returns.

With an arithmetic computational method, daily returns on individual stocks are averaged across both firms and days to obtain the mean daily return on an equally-weighted portfolio; then the portfolio's mean daily return is compounded to obtain an estimate of the expected return over a longer interval. Algebraically, it is

$$R_{AR} = [\ 1/(N \cdot T) \sum_{i} \sum_{t} R_{i,t}]$$

With a buy-and-hold method, individual stock returns are first obtained for the longer interval by linking together the daily individual returns; then an equally-weighted portfolio's mean return is computed by averaging the

long-term (individual) returns. Algebraically, it is

$$R_{BH} = 1/N \sum_i [\prod_t R_{i,t}]$$

He showed that during the 1968-1983 period, the arithmetic method produced an average annual difference of 14.9 percent between AMEX and NYSE stocks while a buy-and-hold method gave an annual return difference of only 7.45 percent with t-statistic of 3.07 and 1.53 individually. Thus he argued that the bias of the true return would be higher if we use the short-interval (e.g., daily) data. He recommended using buy-and-hold means to compute the portfolio returns.

Similar criticism has been raised by Blume and Stambaugh (1983). They argued that due to the bid-ask spread, computing returns with closing prices would bias the actual (true) return. Niederhoffer and Osborne (1966) explained that bid-ask spread produces negative first-order autocorrelation in recorded price changes for individual stocks.

Aside from the impact of the bid-ask spread, the closing price can deviate from what would be the transaction price if the last transaction occurs before the end of the period. This problem, first analyzed by Fisher (1966) and later by Scholes and Williams (1977), is generally referred to as 'non-synchronous trading' and, like the bid-ask spread, is known to produce negative autocorrelation in returns. This non-synchronous trading

also imparts an upward bias to computed single period returns. Blume and Stambaugh (1983), however, showed that, under reasonable assumptions, the magnitude of the non-synchronous trading bias could be negligible compared to the bid-ask spread bias.

Blume and Stambaugh (1983) showed that the return of a security computed with closing prices can be higher than that computed with the market transaction prices. Define the market transaction price at time t of stock i as $P_{i,t}$ the price at which , aside from transaction costs, a share of stock can be both bought and sold at a given time by placing a market order. On the Exchange, the market transaction price can be viewed as the price at which (nearly) simultaneous price market buy and sell orders would cross on the floor. Let $\hat{P}_{i,t}$ denote the reported closing price at time t. It is the price at which the last transaction occurred prior to the close of trading. The closing price, $\hat{P}_{i,t}$ can deviate from the true price, $P_{i,t}$ if, for example, the last transaction reflects a market order on only one side. For example, a market sell order might be matched with a limit buy order or bought by the specialist on his/her own account. The price recorded for such transaction, 'bid' price, is most likely less than the market transaction price. Similarly, a market buy order that is not crossed on the floor results in the recording of an 'ask' price, probably greater than the

market transaction price.

The bid-ask effect can be modeled as

$$P_{i,t} = [\,1 + \delta_{i,t}]\, P_{i,t}$$

where $E[\,\delta_{i,t}\,] = 0$, $\delta_{i,t}$ is independently distributed across t, and $\delta_{i,t}$ is independent of $P_{i,t}$ for all t. The market transaction return for security i for period t can be defined, assuming no dividends for the period, as

$$r_{i,t} = [P_{i,t}/\, P_{i,t-1}] - 1.$$

The computed return can be defined as

$$\hat{r}_{i,t} = [\hat{P}_{i,t}/\, \hat{P}_{i,t-1}\,] - 1$$
$$= \{[1 + \delta_{i,t}\,]\, P_{i,t}/\, [1 + \delta_{i,t}\,]\, P_{i,t-1}\} - 1$$

Combining two equations, we get

$$\hat{r}_{i,t} = \{[(1 + \delta_{i,t})/(1 + \delta_{i,t-1})\,]\, [1 + r_{i,t}]\} - 1$$

Taking expectations of both sides

$$E\,[\hat{r}_{i,t}] = \{E[(1 + \delta_{i,t})/(1 + \delta_{i,t-1})]\, [1 + E(r_{i,t})]\} - 1$$

By Jensen's inequality, $E\{[1 + \delta_{i,t}\,]/[1 + \delta_{i,t-1}\,]\} > 1$

Therefore, $E[\hat{r}_{i,t}\,] > E[r_{i,t}\,]$

The bias can be approximated (using Taylor series) as

$$E[\hat{r}_{i,t}\,] \approx E[r_{i,t}\,] + \sigma^2(\delta_{i,t-1})$$

where $\sigma^2(\delta_{i,t-1}\,)$ denotes the variance. Thus, use of 'closing' price in the computation of individual stock returns bias the market transaction returns upward by the magnitude of the variance.

Stoll and Whaley (1983) and Blume and Stambaugh (1983) showed that the magnitude of the bid-ask bias of the large firm stocks are negligible while that of the small firm

stocks are not. Considering the fact the Portfolio HD1 in the previous chapters contains more small firm stocks, this bid-ask bias might have some impact on the computed returns. This study now turns to this issue.

Accordingly, bid and ask prices for the NYSE listed stocks were obtained for the day of December 1, December 30 of 1981 and January 4 , January 29 of 1982. One thousand and three hunderd fifty nine stocks that have complete bid and ask prices for the four days were selected and five possible returns, which are shown in Table V-1, were calculated.

While the December return was computed with December 1 and December 30 data, January return was computed with December 30 and January 29 data. The relationship between the five possible returns and the computed returns with closing prices (henceforth CPRT) was studied by looking at the Pearson correlation coefficients. Table V-2 and V-3 show the coefficients for December and January returns respectively.

Table V - 1

Possible Returns From Bid and Ask Prices

Beginnig Price	Ending Price	Return
BID	BID	BBRT
ASK	ASK	AART
BID	ASK	BART
ASK	BID	ABRT
Average	Average	AVRT

Average = (Bid + Ask) / 2

Table V - 2

Pearson Correlation Coefficients of December Returns

	CPRT	BBRT	AART	ABRT	BART	AVRT
CPRT	1.0000					
BBRT	.0217	1.0000				
AART	.0204	.9833	1.0000			
ABRT	.0237	.9851	.9742	1.0000		
BART	.0178	.9709	.9830	.9304	1.0000	
AVRT	.0212	.9956	.9960	.9837	.9812	1.0000

Except the coefficients of the CPRT, all are significant at the 99 % level

Table V - 3

Pearson Correlation Coefficients of January Returns

	CPRT	BBRT	AART	ABRT	BART	AVRT
CPRT	1.0000					
BBRT	.7121	1.0000				
AART	.6649	.9137	1.0000			
ABRT	.7107	.9848	.9121	1.0000		
BART	.6573	.9160	.9863	.8856	1.0000	
AVRT	.7028	.9759	.9804	.9681	.9736	1.0000

All are significant at 99 % level

The correlations are higher among the five possible returns than with the CPRT. The low correlation coefficients and low significance of the December CPRT (Table V-2) seem to come from the fact that the five possible returns were computed with December 1 and December 30 data while CPRT was computed with November 30 and December 30 data. Since the closing price of a stock could be at the closing bid, closing ask or somewhere else (either within or outside the closing bid-ask range), a stock's return computed with the closing prices might deviate from its actual (true) trading return.

The average of bid-ask spread for the stocks are as

follow:

It is $ .270 (1.6% of bid price) in December 1 1981

It is $ .277 (1.6% of bid price) in December 30 1981

It is $ .280 (1.6% of bid price) in January 4 1982

It is $ .275 (1.6 % of bid price) in January 29 1982

While the magnitudes of the bid-ask spreads are different, they are all 1.6 % of the bid price for all four days.

Investors using market orders purchase stocks at the ask and sell at the bid. Assuming the December return is determined on that basis, the following test has been performed. Once the December return is computed, the stocks were divided into ten portfolios, like in the previous study, according to the magnitude of their returns. And the following possible five January returns to each portfolio were computed and compared with the market (mean deviation) without any risk-adjustment. Since all the samples are from NYSE, NYSE composite index for the same data dates were used as market proxy. Table V-4 shows the result. The same analysis with the closing prices are also shown in the last column for comparision.

Table V - 4

Five January Portfolio Returns
Stratified on December Returns

	BBRT	AART	ABRT	BART	AVRT	CPRT
HD1	.019	.018	-.010	.048	.018	.000
	(1.900)	(1.800)	(-1.000)	(4.363)	(1.800)	(.000)
HD2	.013	.013	-.005	.032	.013	.004
	(1.625)	(1.857)	(-.714)	(4.000)	(1.857)	(.005)
HD3	.006	.007	-.009	.023	.006	.001
	(.857)	(1.000)	(-1.286)	(3.286)	(.857)	(.167)
HD4	.005	.007	-.009	.020	.006	.014
	(.556)	(.778)	(-1.000)	(2.222)	(.667)	(2.000)
HD5	-.005	-.006	-.019	.008	-.005	-.006
	(-.714)	(-.857)	(-2.714)	(1.143)	(-.714)	(-.857)
HD6	.006	.007	-.007	.021	.006	-.013
	(.750)	(.875)	(-.875)	(2.625)	(.750)	(1.625)
HD7	-.007	-.008	-.019	.004	-.008	-.006
	(-.778)	(-1.000)	(-2.375)	(.444)	(-1.000)	(-.857)
HD8	-.002	-.002	-.016	.012	-.002	-.016
	(-.286)	(-.286)	(-2.286)	(1.714)	(-.286)	(-2.286)
HD9	-.004	-.004	-.015	.008	-.004	.001
	(-.571)	(-.571)	(-2.143)	(1.143)	(-.571)	(.077)
HD10	-.006	-.005	-.020	.009	-.006	-.021
	(-.750)	(-.625)	(-2.500)	(1.125)	(-.750)	(-3.000)

t-values are in the parenthesis

When the January return was computed on the Bid-Ask basis (beginning bid, ending ask), all the portfolios show

positive market differential returns. When the returns were computed on the Ask-Bid basis, however, all the portfolios show negative market differential returns. Investors using market orders would not outperform the market even if they hold the Portfolio HD1. December losers still, however, tend to outperform the December winners. Returns still seem to decrease, with the samples restricted to the NYSE issues, as we move from HD1 to HD10, although not so significantly as in the previous study. Thus, regardless of the return computation methods, the losers seem to do better than the winners in the following month, although the magnitude is not large enough to cover transaction costs. When the returns were computed for the possible bid-ask combinations, however, only those who can buy at bid and sell at ask seem to have returns that are likely to cover the transaction costs before risk-adjustment.

To check the tax-loss selling hypothesis in another way, regression of the form January = a + b December^{+} + c December^{-} has been performed for each five January returns. Table V-5 shows the result.

Table V - 5
Regression Results of the Five Returns

	Intcpt	Winners	Losers
BBRT	-.028	.002	-.116
	(-6.920)	(.026)	(-2.316)
AART	-.028	.003	-.112
	(-6.884)	(.040)	(-2.300)
ABRT	-.038	-.030	-.020
	(-9.515)	(-.379)	(-.414)
BART	-.018	.037	-.214
	(-4.290)	(.444)	(-4.194)
AVRT	-.028	.003	-.114
	(-6.918)	(.034)	(-2.309)
CPRT	-.032	.001	-.086
	(-9.380)	(.622)	(-1.689)

t-values are in the parenthesis

Regardless of the methods used to compute the January returns, association of the losers with the January return was always negative. While the slopes of the winners are virtually equal to zero, those of the losers are quite statistically different from zero except ABRT. Considering the fact that many investors using market orders are buying at the ask and sell at the bid, the insignificant slope of the ABRT casts doubt on the trading value of the negative association of the losers.

For ABRT, while both the slopes of the winners and

losers are negative and statistically insignificant, the intercept term, which indicates the market effect, is highly significant. When the same slopes were computed using the closing prices (CPRT), the winners have a positive but insignificant slope and the losers have a negative and significant slope. December losers' returns may be negatively associated with January returns when the returns are computed with closing prices. December and January returns are not found to be negatively related when they are computed using the prices that would result from using market orders. Only the effect of the market, which is found in the intercept term, seems to be significant.

Chapter Summary

As several researchers have discussed, use of the closing prices to compute a stock's return would bias the actual trading return. When the returns were computed assuming an investor uses market orders, the negative return association of the losers seems to be diminished in its magnitude and significance level. Though based on a year's data, the results seem to suggest that while the negative autocorrelation is still found, the magnitude of the market differential returns would not offset the transaction costs or provide a profitable trading strategy.

C H A P T E R VI

CONCLUSION

In the preliminary study of Chapter III, several questions were raised regarding the abnormal January return. The present study concluds by offering answers to those questions with the results found. First, is Portfolio HD1 the only contributor to the abnormal January returns? If so, do they persist over time ? Yes, before risk-adjustment, Portfolio HD1 (the lowest decile of performance for December) seems to be the only contributor to the high January return. The other portfolios do not seem to outperform the market throughout the years studied. And the magnitude seems to be large enough to cover the transaction costs. The year-by-year comparision, however, shows that high market differential returns for Portfolio HD1 in January are variable over time. These initial results supported the tax-loss selling hypothesis.

Second, do we obtain similar results after risk-adjustment? Yes, the Portfolio HD1 seems to outperform the market even after risk-adjustment.

The magnitude of the abnormal returns to Portfolio HD1 are, however, greatly reduced after risk-adjustment. The composition change of the samples, however, seem to have as much impact. Third, are the risk-adjusted abnormal returns large enough to cover the transaction and search costs? No, the abnormal returns to Portfolio HD1 do not seem to be large enough to cover the transaction costs. Risk-adjustment and the composition change of the portfolios seem to eliminate most of the abnormal returns found in January. One thing to note, however, is the abnormal returns to all portfolios in June. In June, all the portfolios show positive abnormal returns regardless of their previous month returns. While this result was left unexplained, further study is suggested.

Fourth, does the composition of each portfolio differ? Yes, the composition of portfolios do appear to differ. Portfolio HD1 contained more AMEX and OTC stocks and low-priced stocks than a random distribution would imply. Since the market value of a firm may be measured by multiplying the stock price with the number of shares issued, small firm stocks might also be low-priced stocks. The analysis found that small firm stocks and low-priced stocks tend to outperform the large firm stocks and high-priced stocks. Since the composition of the Portfolio HD1 does not differ much among months, these stocks were not expected to perform especially well only in January.

Thus, the abnormal January return is either due to the tax-loss selling effect or strong association of these stocks with the tax-loss selling pressure. In either cases, the tax-loss selling hypothesis could not be rejected.

Fifth, does the tax-loss selling occur throughout the year? Portfolio HD1 consistently outperformed the market throughout the years. Considering the magnitude of the differential returns in months other than January, tax-loss selling is not likely to occur throughout the year. Except January, most of the market differential returns are less than 4 percent. And differential returns of this magnitude might well result from using closing prices (as opposed to closing bids for example) to compute returns.

Sixth, do the investors realize long-term capital gains by selling off Portfolio HD10? The poor performance of the Portfolio HD10 could be interpreted in the same way. Since the reported closing price (which is simply the price of the last trade) could be at the closing bid, closing ask or somewhere else (either within or outside bid-ask range), stocks whose reported closing prices are near or below the bid are more likely to show negative close-to-close returns than are those which close at the ask. Considering the fact that the magnitude of the differential returns to Portfolio HD10 ranges from -1.1 % to -2.6 %, the bid-ask spread might explain the poor performance of these

portfolios.

Seventh, do portfolios tend to maintain their returns at the market level regardless of their risk level? While the portfolios maintained their return at the market level as we moved to the middle groups, this pattern does not persist regardless of the portfolios' risk levels. The explanations could also be found in the bid-ask spread. Returns computed with the closing prices exhibit modest negative autocorrealtion.

Eighth, does the instability of the market differential returns of Portfolio HD1 in January suggest the influences of the market conditions on the specific year? The abnormal returns to Portfolio HD1 in January really fluctuate widely over time. While they are positive in some months, they are negative in others. Even the positve abnormal returns are, sometimes, not sufficient to cover the transaction costs. This instabilty of the abnormal returns might be the reason for this prolonged "January Effect". The specific economic conditions in a given year appear to have different impacts on the magnitude of the "January Effect". Consequently the effect varies over time and this appears to be a fruitful topic for subsequent research.

Overall, the high January returns seemed to be associated with the tax-loss selling in the preceding December. Moreover, the effect seems to be more pronounced

among small firm stocks and low-priced stocks. Risk, however, explains most of the observed high January returns. The abnormal returns are not likely to be exploited by the arbitragers due to transaction costs and low liquidity. Incentives for them to participate in the trading strategy and eliminate the effect may be insufficient.

Further work should be directed toward disentangling the relative impact of the low-priced stocks. The return comparision of the low- and high-priced stocks in the Portfolio HD10 (the winners) might provide another interesting result. While change of the composition might explain at least a part of it, the positive abnormal returns to June portfolios should also be studied further. Time varying magnitude of the January return, the tendeny of the middle portfolios to maintain their return at the market level and closing bid-ask study for daily data of the submarkets should answer more about the January effect.

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